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October 1953

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Dental Digest

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OCTOBER 1953

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The magazine is mailed on the fifteenth of the month of issue.

PROSTHETIC COUNTERPOISE

in Overbite Cases

BLAIR C. MADSEN, D.D.S., Miami, Florida

DIGEST

The discussion in this article of the principles of prosthetic counterpoise (the introduction of an equivalent power in opposition to a destructive force in the masticatory mechanism) is limited to the manner in which it is applied in Class 1 and 2 overbite cases. A detailed description is presented of the technique employed for providing balancing support to relieve the trauma imposed upon the incisor teeth in incisive function.

The Masticating Mechanism

Study of the history of man reveals that nature designed a masticating mechanism intended to function with multiple and balancing cusp contacts. This precise function was intended to exist, not only in hinge axis closure, but in right and left lateral and protrusive movements of the mandible.

Environmental and Dietary Influences—It is generally agreed that environment and dietary refinements are responsible for the lack of normal wear on the teeth. This factor, in addition to the tendency to continuous eruption, has resulted in the locked-cusp type of bite. Incisal overbite in varying degrees is usually found associated with the locked-cusp type of bite.

Product of Civilization—P. R. Begg[1] states: "Man was not intended to retain all of his tooth substance. Rough coarse food, incised and chewed, produced flattened occlusal surfaces and an edge-to-edge incisor bite. In assuming this edge-to-edge incisor bite, man's lower teeth moved forward and assumed a relationship in which the cusps were unlocked. That is normal for adult man. Civilization alone has produced the incisal overbite and lack of attrition."

Functional Malocclusion — When locked cusps and incisal overbite interfere with simultaneous contact of all teeth in hinge axis closure, or interfere with bilateral balance in all masticatory ranges, a condition occurs that is known as functional malocclusion. The destructive effect of functional malocclusion on the supporting structures, the arch form and the temporomandibular articulation is understood and recognized by practitioners.

Corrective Techniques Established—Techniques for the correction of function malocclusion by occlusal equilibration, or selective grinding, are now well established and practical in application. It is agreed that occlusal equilibration should be accomplished, as prescribed by various authorities[2,3,4,5,6], before extensive operative, restorative, or periodontal treatment is attempted.

Problems in Correction—Interferences existing on certain teeth which alter the normal hinge axis closure can be corrected. Interferences existing in right and left lateral excursive movements can also be corrected by occlusal equilibration. Attempts to relieve the trauma imposed on the incisor teeth in protrusive excursion have been limited because of the extensive overlapping of the incisor teeth, known as overbite.

Stress in Incisor Teeth—When the mandible is thrust forward into protrusive or incisive position, the posterior teeth are usually disengaged, throwing the entire stress of the muscular forces on the incisor teeth. Esthetic and anatomic factors have made it impossible to shorten the upper incisors sufficiently to permit the posterior teeth to come into contact to relieve the stress on the incisor teeth in incisive function.

Definition of Deep Bite—In regard to incisal oxerbite Schweitzer[7] makes the following statement:

"Where the maxillary incisors overlap the mandibular incisors more than one-third without a compensating overjet, we are dealing with a deep bite. A deep bite must not be confused with a closed bite. A closed bite is due to abrasion, either chemical or mechanical, or to a mutilation in some form of the dental apparatus. A deep bite is normal to the individual whereas a closed bite is the result of some disorder. In protrusion, the overbite throws the entire stress of

[1]Begg, P. R.: The Relationship of Orthodontics to General Practice, Am. J. Orthodontics **31**:10 (Oct.) 1945.

[2]McLean, David W.: Diagnosis and Correction of Pathologic Occlusion, JADA **29**:1202 (July) 1942.

[3]Schuyler, Clyde H.: Fundamental Principles in Correction of Occlusal Disharmony, Natural and Artificial (Grinding), JADA **22**:1193 (July) 1935.

[4]Westbrook, J. C., Jr.: A Pattern of Centric Occlusion, JADA **39**:407 (Oct.) 1949.

[5]Madsen, B. C.: Occlusion: A Cardinal Consideration, JADA **41**:691 (Dec.) 1950.

[6]Madsen, B. C.: Functional Malocclusion in Orthodontics, Am. J. Orthodontics **37**:9 (Sept.) 1951.

[7]Schweitzer, J. M.: Oral Rehabilitation, St. Louis, C. V. Mosby Company 1951, pp. 771-814.

the masticating muscular forces upon the incisors without adequate posterior support. There are many cases in which the incisors cannot tolerate this strain, and in middle or old age, will break down."

Classification of Overbite—W. L. Wylie[8] has classified overbite cases into three groups:

1. Slight overbite. Where the overlapping of the incisors is from 1.5 to 2 millimeters.

2. Medium overbite. Where the overlapping is more than 2 millimeters but with the lower incisors not in contact with the cingulum of the upper incisor.

3. Severe overbite. Where the mandibular incisors are in contact with the cingulum of the upper incisors or the gingival tissue lingual to them.

Results of Study—Huber and Reynolds[9] studied the dentition of 500 male university students. Only forty-three students, or 8.6 per cent, had anatomically correct dentitions, and the average overbite for the entire group was one-half of the clinical crown of the lower incisors. All of these cases would show, or be expected to show, evidence of breakdown of the supporting structures around the incisor teeth because of trauma in incisive function.

Importance of Reduction of Traumatic Forces

The orthodontist, periodontist, and prosthodontist realize the importance of reduction of traumatic forces in the incisive function or protrusive excursion. Relatively few patients will demonstrate continuous contact of the posterior teeth throughout the entire functional range of protrusive excursion.

Possible Effect of Posterior Balancing Support—It is logical to assume that if posterior balancing support could be supplied throughout the entire protrusive excursion, to offset the traumatic forces upon the incisor teeth, the incisor teeth could be relieved of trauma and thereby be retained in a healthy condition.

Bite Opening Unnecessary—Most attempts to relieve trauma in the anterior teeth have been in the form of bite opening, such as (1) occlusal reconstruction, (2) bite plates, and (3) splints. It is the author's belief that in Group 1 and 2 deep bite cases where the curve of Spee is fairly normal, bite opening is not only unnecessary but in many instances to be avoided. Increasing the vertical dimension from a bite that is normal to the patient by building up posteriorally on inlays, splints, and bite plates may produce unfortunate results.

Dysfunction From Bite Opening—Temporomandibular dysfunction, if encountered as a result of bite opening, may be due to a slight repositioning of the condyle in the fossa. Functional malocclusion may be induced by the introduction of inclined planes which do not function properly in hinge axis closure or excursive movements of the mandible. If evidence of periodontoclasia is noted as a result of bite opening, it is usually due to the induced functional malocclusion in addition to the fact that in most cases of bite opening the cuspids are taken out of contact.

Cuspids Intended to be Support of Vertical Dimension—The author is firmly convinced that the cuspids, because of their position in the arch and the design of their long and strong root formation, were intended among other functions to be the anterior supporting columns of the vertical dimension. Clinical observation indicates that periodontal disturbances become evident when cuspid contact is not present in centric occlusion.

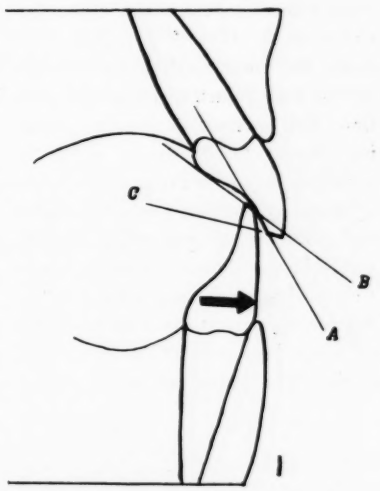
Prosthetic Counterpoise

The principle of prosthetic counterpoise is simply the addition of an equivalent power or force which will act in opposition to a force which is destructive to any part of the masticatory mechanism.

Preliminary Measure—An analysis of the patient's functional occlusion by means of study models mounted on an anatomic articulator should be the deciding factor as to the possibility of providing posterior balancing support throughout the entire protrusive functional range. It is imperative that centric relation and centric occlusion be correlated by occlusal equilibration before attempting to provide posterior balancing support.

Limitations of Occlusal Equilibration—Part of the stress which is thrust upon the incisor teeth in protrusive excursion can be relieved by occlusal equilibration. If the upper central and lateral incisors are longer than the cuspids and if esthetic and anatomic factors permit, they can be shortened to relieve the stress somewhat.

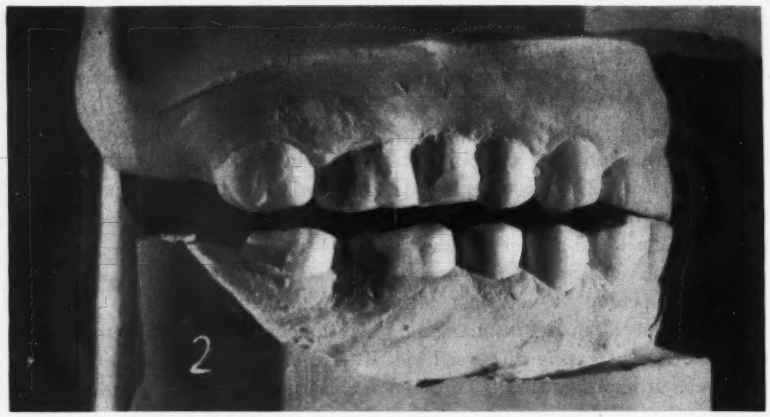
Reduction of Trauma in Protrusive Excursion—The red and blue technique should be used in correcting the remaining gross interferences in protrusive excursion (Fig. 1). Red inking ribbon is used to register centric contact; blue carbon paper is then used to register the path of protrusive movement. The objective in reduction of trauma in protrusive excursion is accomplished by reducing the steep incline (A) upon which the lower incisor must travel, to lesser incline (B). This reduction must be made on the upper anterior teeth



1. ***Method of correcting interference on incisors in protrusive excursion.***

[8]Wylie, W. L.: The Relationship Between Ramus Height, Dental Height and Overbite, Am. Orthodontics **32**:57-67 (Feb.) 1946.

[9]Huber, R. E., and Reynolds, J. W.: A Dentofacial Study of Male Students at the University of Michigan in the Physical Hardening Program, Am. J. Orthodontics **32**:1-21 (Jan.) 1946.



2. ***Articulated casts in protrusion. The entire stress of masticating muscular forces is thrust upon the incisors without adequate posterior support.***

from the outer edge of the red centric mark to the termination of the blue mark.

Selective Grinding Employed—The lower anterior teeth should *not* be reduced to incline (C) in order to permit them to clear the upper anterior teeth. If this grinding were done, the lower teeth would extrude and in time return to traumatic position. This method of selective grinding should be continued until the stress of protrusive excursion is borne by as many anterior teeth as possible and functioning smoothly. Esthetic and anatomic factors make it impossible to shorten the upper incisors sufficiently to permit the posterior teeth to come into contact as nature intended. The entire stress of protrusive excursion is still upon the incisor teeth (Fig. 2).

Theory of Posterior Balancing Support

In traveling from centric (Fig. 3) into protrusive (Fig. 4) point (A) of the lower incisor must move forward and downward along plane (A). Simultaneously, point (B) must move upward and backward along imaginary plane (B).

Reduction of Stress—If a plane such as plane (B) could be established along which point (B) could function in harmony with the angle of inclination of plane (A), the stress along plane (A) could be reduced during the incisive stroke.

Provision of Posterior Balancing Support—The creation and practical application of a functional plane such as plane (B), which would not interfere with centric or lateral excursions, would provide posterior balancing support in protrusive excursion and thereby eliminate the trauma thrust upon the incisors in overbite cases. If the curve of Spee is not too acute and the inward slope of the upper incisors is not too great, the possibility of providing posterior balancing support is feasible.

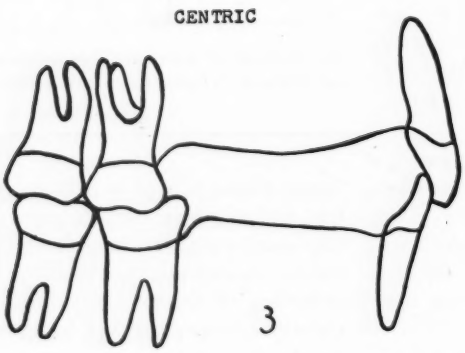
Operative Procedure

1. The first step in operative procedure to provide posterior balancing support is the preparation of MOD cavities, slice or slice-lock type, in the first and second molars on both sides of the lower arch. Interproximal soft tissue which might interfere with access of the impression material to the gingival margins must be removed or temporarily depressed

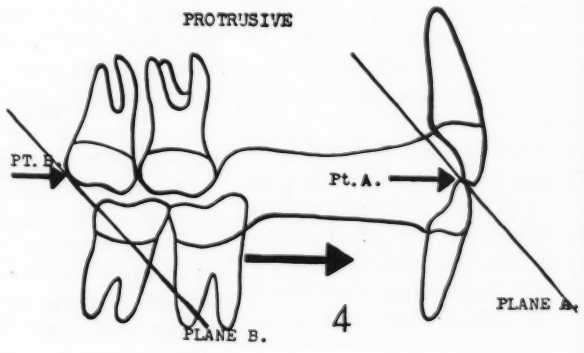
2. An accurate hydrocolloid impression is taken of the entire lower arch followed by an alginate impression of the upper arch and a wax bite record of centric.

3. The wax bite record should not include the cuspids or incisors (Fig. 5). The operator, by direct observation, can be assured that cuspid contact and a record of true centric closure has been obtained.

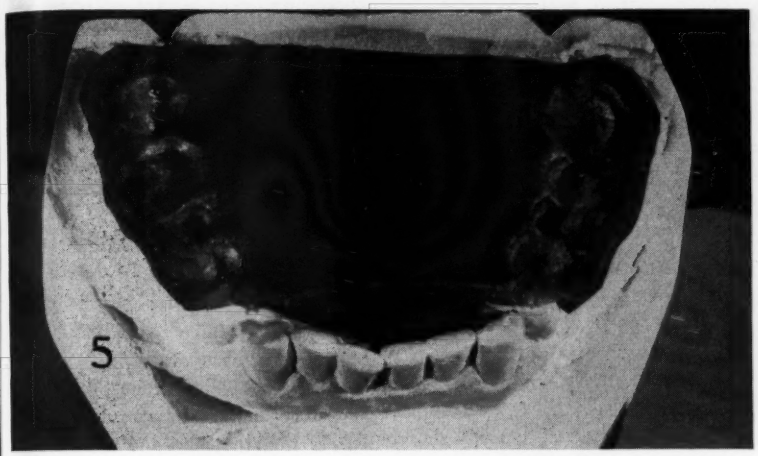
Preparing and Pouring Impressions—1. The four cavity areas are poured first, in die stone. Matrix



3. ***Positional relationship of mandibular and maxillary teeth in centric.***



4. ***Positional relationship of mandibular and maxillary teeth in protrusive. The large arrow indicates the direction of movement.***



5. ***Bite record of centric in wax.***

metal strips are used to prevent the die stone from running together while pouring these areas of the impression (Fig. 6). The metal strips should be cut long enough to engage the buccal and linguál of the hydrocolloid between the impression of each cavity preparation. Care should be taken to avoid cutting or encroaching upon the gingival marginal areas of the impression during placement of the metal strips.

2. Die stone should be mixed to a thick consistency and vibrated carefully into each cavity, filling the cavity, slightly to excess.

3. Sprinkle additional powder upon each cavity area until the filling is of the consistency of putty and insert dowel pins, carefully centered and alined, over each cavity area (Fig. 7).

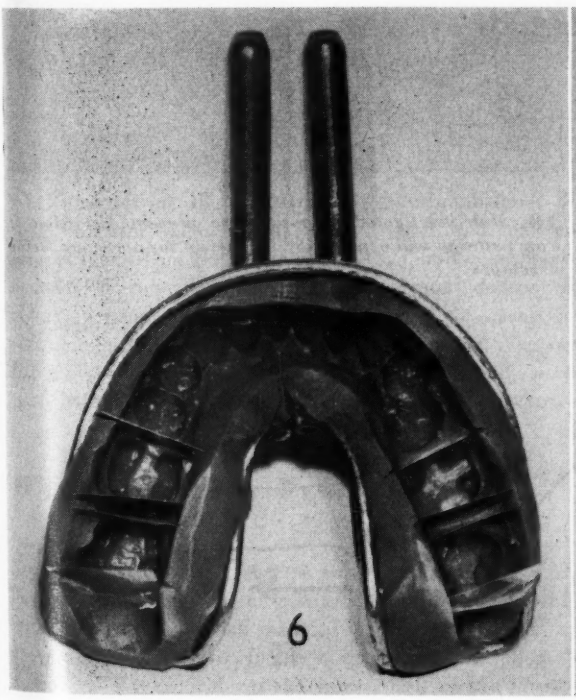
4. The impression is placed in a humidor until the die stone has set. The pins and models are left intact in the impression and are painted with vaseline.

5. A thin mix of stone is prepared and the master model poured, without vibration to prevent movement or distortion of the pins or dies.

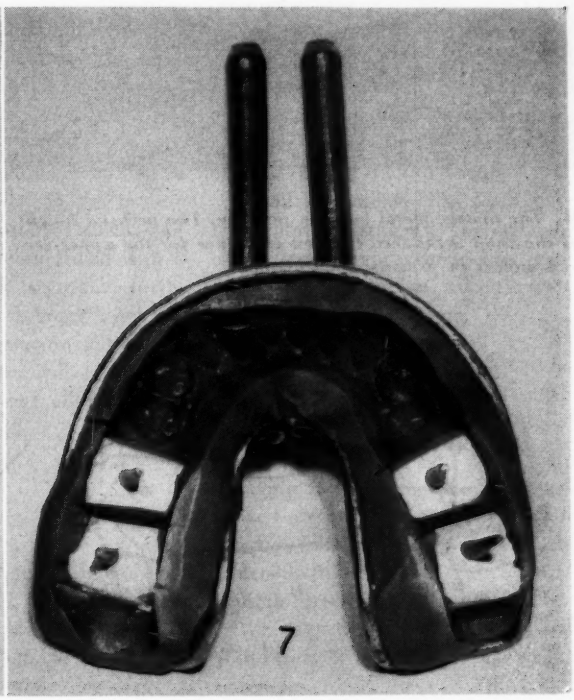
6. After the stone has set, separate the master model from the impression. The abutment teeth may now be removed, trimmed, and replaced upon the model (Fig. 8).

7. The models should be mounted upon an anatomic articulator using a face-bow transfer or similar instrument. The accuracy of mounting upon the articulator and the adjustment of the articulator can be checked by use of bite records previously taken.

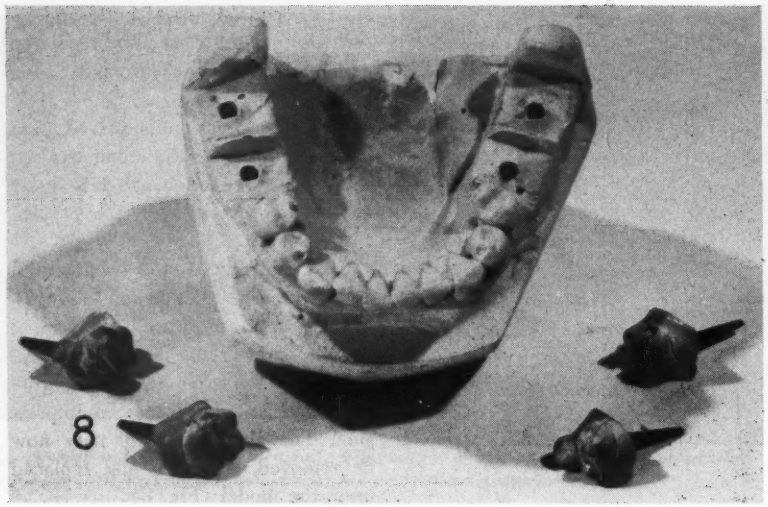
Fabrication of Wax Patterns—1. Matrix metal bands should be cut, fitted, and scribed to embrace the distal part of each lower second



6. ***Hydrocolloid impression. Metal strips in position.***



7. ***Hydrocolloid impression. Dies are poured, pins are in place, and strips are removed.***



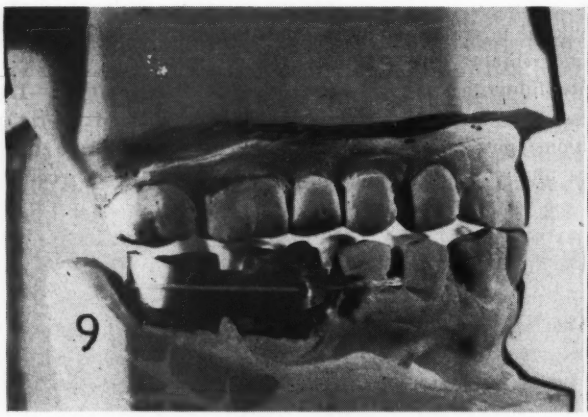
8. *Dies removed from model for trimming.*

molar. The occlusal section of each band should extend well above the occlusal surface at the distal of the second molars (Fig. 9). The occlusal height of each band should be reduced, if necessary, to permit clearance of the upper second molars in protrusive excursion.

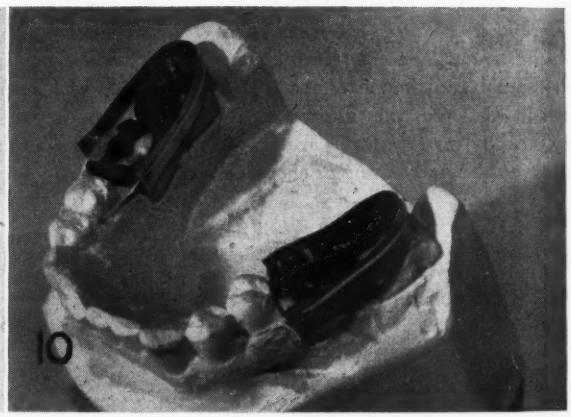
2. Holes should be punched at each end of the matrix bands and a ligature threaded through the holes. The ligature should be brought forward and threaded through a hole drilled between the bicuspid teeth.

3. The matrix bands may be securely tied in place and the cavities waxed as individual units.

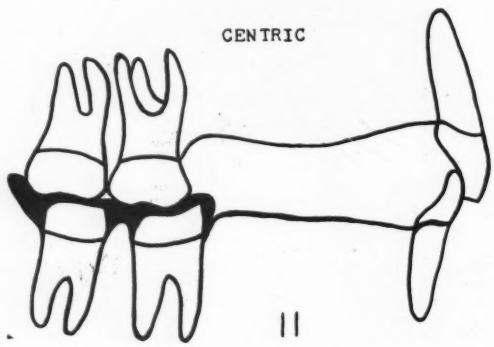
4. The second molar patterns should be built up in excess at the distal to the height of the matrix bands. The matrixes will prevent distortion or dislodgement of the wax

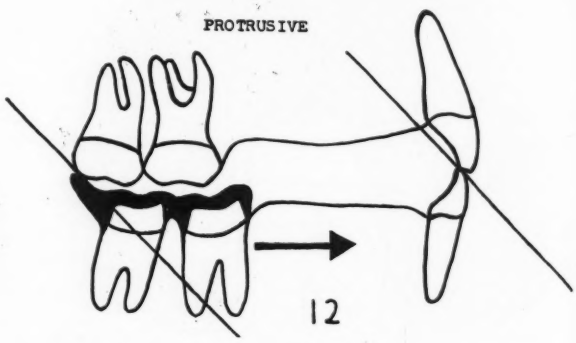


9. *The matrix metal band in position. The occlusal height of the band is reduced to allow clearance for the upper second molars in protrusive excursion.*



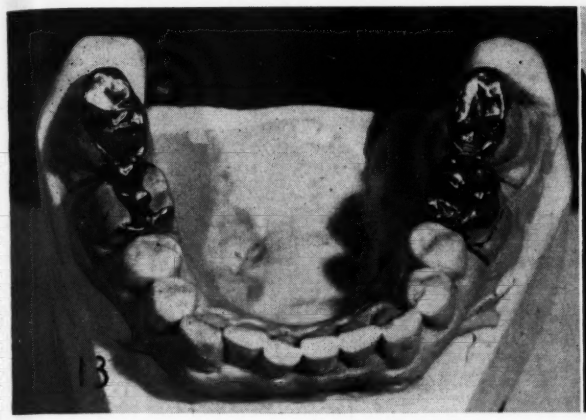
10. *Matrixes ligated in position to prevent distortion of wax patterns while posterior balancing supports are being developed.*



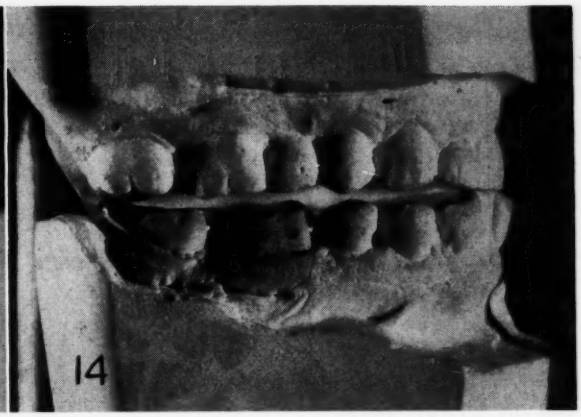


11. *Lateral view of wax patterns in centric.*

12. *Lateral view of wax patterns. Posterior balancing support is shown functioning in harmony with the plane of function of the incisor teeth in protrusive excursion.*



13. ***Finished castings of each side soldered together and in position on the master model.***



14. ***A state of equilibrium is shown existing between the forces applied to the incisor teeth and the posterior balancing support.***

patterns when stress is applied during the time of development of posterior balancing support (Fig. 10).

5. The wax patterns in the second molars should fit snugly to the distal section of the upper opposing molars and still allow for closing of the articulator in centric (Fig. 11).

6. Lubricate the upper second molars and warm the wax at the distal part of each lower second molar with a blow pipe. The articulator may be moved repeatedly from centric into protrusive position. This procedure should be continued until a functioning plane is developed in the wax pattern which coincides with the plane of function of the incisor teeth in protrusive excursion (Fig. 12).

7. The part of the wax pattern where posterior balancing support is being developed should not be carved manually. Permit the upper second molars to produce the amount and path of reduction of the wax surface that is necessary to function harmoniously with the incisor teeth.

Casting and Soldering—1. Remove, invest, and cast the wax patterns as single units. Place the castings in their respective cavities, perfect the occlusion in centric, solder together the inlays of each side, and replace on the master model (Fig. 13).

2. Using Pittsburg Prussian Blue painted on the teeth of the upper model or carbon paper between the two models, the occlusal aspects of the posterior balancing supports may be perfected to establish the approximate degree of balance desired between the incisors and the posterior balancing supports in protrusive function (Fig. 14).

Cementation and Final Adjustment—The final adjustment for a state of balance between the incisor teeth and the posterior balancing supports can be accomplished with a greater degree of accuracy forty-eight to seventy-two hours after cementation. The occlusion in centric, lateral, and protrusive excursions must be checked and all remaining interferences removed to the satisfaction of the operator and the comfort of the patient.

Conclusion

Because of the variations in dentition and the anatomy of the dental arches, this technique cannot be applied universally and made practical as a panacea in all overbite cases. In cases where the technique has been employed it has been possible, because of reduction of trauma, (1) to demonstrate an arrest in the destruction of arch form anteriorally, and (2) to demonstrate clinically and roentgenographically the restoration of the supporting structures of the incisor teeth to a state of health.

Recall of patients has been only for minor adjustments. The evidence of continued improvement has justified the intervention necessary to achieve the desired result.

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BODY CHEMISTRY

in Health and Disease – Part Two

MELVIN E. PAGE, D.D.S.,
and D. L. BROOKS, A.B., St. Petersburg, Florida

D I G E S T

Body or anthropometric measurements, in addition to exacting blood tests, are the tools of the present approach to the problem of degenerative disease, including dental disease. The shape of the teeth is related to the shape of the jaw, the shape of the face, and the shape of the body. Dentists measure intermaxillary distances for restorative procedures; they may also measure bodily results of glandular activity which regulate time of tooth eruption, shape of jaws, and the condition of gingival tissue. They may measure anatomic structures to make a retrograde evaluation of systemic causes. Different types of dental disease occur in people with correspondingly different endocrine patterns.

If, on the basis of endocrine patterns, the chemical relationships in the blood can be altered and oral manifestations of ill health be influenced, a reference point for treatment has been established. The interrelationship of body shape to the incidence of dental caries can be charted and endocrine interpretation of graphed body measurements can present a history of a person's glandular activity. The validity of this interpretation is dependent upon accuracy in duplicating the measurement technique described in this article.

Anatomic Relationships

Dentists have long recognized the relationship between the size and shape of a person's teeth, his arch form, his facial shape, and body size. It is, therefore, not difficult to grasp the possible relationship of other body configurations to systemic factors underlying oral diseases. The shape of a tooth is related to the shape of the face. The shape of a tooth is likewise related to the general body size and also to the general body shape (the somatotype).

Alterations in Thought Patterns—Modes of thinking must be transferred from terms of interrelationships of parts within a section to interrelationships between sections that constitute the whole; from recognition of diseased states within a part, to disease causes affecting the whole. Knowledge of basic factors and recognition of the totality of interdependence is essential to prevention of degenerative changes, such as dental ills.

Basis for Extending Dental Services—Dental training in the visualization of interrelationships within the mouth provides an excellent background for the attention to detail that is required in this new aspect of prevention, which broadens the scope of dental service.

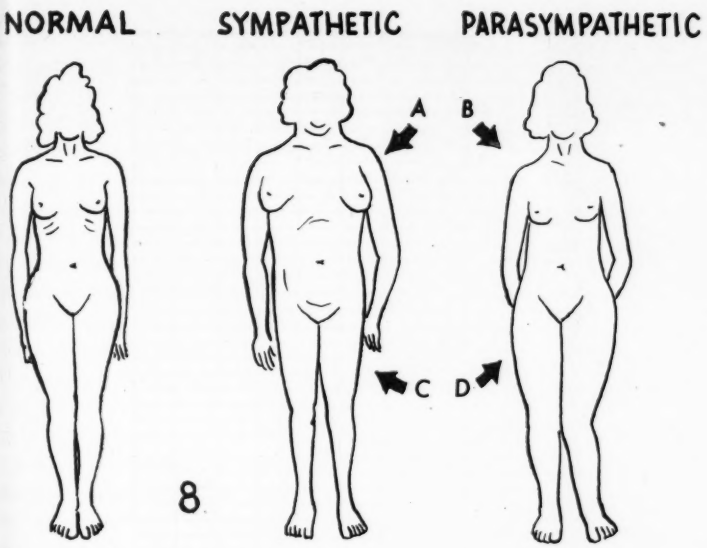
Reference to Systemic Causes in Oral Conditions—Prosthodontists measure intermaxillary distances for restorative dental treatment. It is also within the scope of dental service to measure the results of glandular activity which regulate the timing of tooth eruption, the shape of the jaws, and the health of the soft and hard supporting tissues. In short, to measure anatomic results and refer to historic systemic causes.

Relationship of Dental Disease to the Endocrine Pattern—The type of dental disease to which a person is susceptible bears a distinct relation to what is called his endocrine pattern (the graphed results of individual anthropometric measurement). An endocrine pattern showing underactivity of the parasympathetic glands, as described previously, indicates susceptibility to dental ills of a phosphorus deficiency origin. The opposite type of endocrine pattern showing abnormal activity of the sympathetic glands indicates susceptibility to dental ills of a high phosphorus origin.

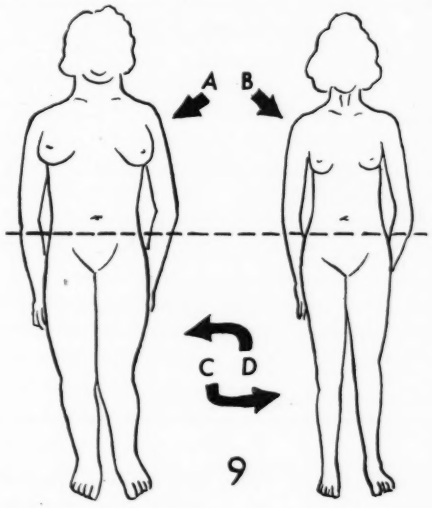
Variations in Endocrine Patterns—Not only are people definitely parasympathetic or sympathetic in type, but in addition there are innumerable persons with "mixed" endocrine patterns. That is, there are people with underactivity of some parasympathetic glands and overactivity of other glands in the parasympathetic group.

Typical Differentiations—Two distinct tendencies in body configuration can be observed in dental practice, among friends, and among the passersby in the street:

1. Thick necked, barrel chested people with spindle legs who carry the greater proportion of their weight above the waist (sympathetic types).
2. Contrasting types who have



8. ***Drawing showing a normal feminine somatotype, a sympathetic dominant body configuration, and a parasympathetic dominant figure.***



9. ***Schematic drawing showing the transposition of the upper body of the sympathetic dominant type and the lower body of the parasympathetic type and vice versa. This kind of transposition would result in two normal somatotypes.***

narrow shoulders, extremely flat chests, and heavy legs (parasympathetic types).

Combinations of Extreme Types—The remainder of the population includes combinations of the two extremes (the sympathetic types and the parasympathetic types). The normal, exceptional person has a trim figure, sparkling eye, and alert step. Visualization of the normal, the parasympathetic, and the sympathetic body types is possible in Figure 8.

Method of Differentiation—In order to distinguish between the innumerable combinations of types it was necessary to devise a measuring stick. Consequently, a test was evolved supplying what might be described as a blueprint of the glandular type with which each person was endowed at birth.

The Genetic Inheritance—Each person is the result of countless ancestors; his endocrine pattern is his inheritance from them. He can improve his inheritance or depreciate it according to the manner in which he treats his body. The quality of building material (food) which he supplies his body is an important factor. In the main, the human body develops during the growing years according to the dictates of genetics and nutrition. People are thin, or fat, depending (1) upon which ancestors were the sources for the chemical mechanism which controls their assimilating ability, and (2) upon the dietary knowledge of their mothers.

Basis of Treatment

Since growth, development, deposition of fat, length of bone, and timing of tooth eruption are dependent upon the chemical mechanism, the results of such activity can be computed in the body. If, as stated previously, by trial, error, and correction on the basis of patterns thus obtained, the chemical relationships in the blood and the oral manifestations of ill health can be altered, a point of reference has been established for treatment. It is on this basis that this entire technique has developed. To aid in evaluating the succeeding articles, the methods of measurement and their rationale will be discussed in detail.

Rearrangement of Types—Refer to Figure 8 which shows a normal figure, an extreme parasympathetic, and an extreme sympathetic type. It is noted that (1) the parasympathetic type carries her weight below the waist, and (2) the sympathetic type above the waist. Switch the body halves of these two abnormal figures and match-mate their upper bodies and lower bodies. The result is two normal appearing people (Fig. 9).

Anatomic Exchange Impossible—Since anatomically such exchanges are impossible it was proposed that the *relative* proportions of each of these people be studied, the results graphed and interpreted. To do this, a system of measurements easy to apply and giving equal value to two disproportionate halves of the body had to be evolved. The method which resulted will be reviewed briefly and correlations to the body shape and dental caries indicated before de-

scribing the measurement technique.

Development of Measuring Technique—In the measurement plan the following steps were taken:

1. The forearm and leg, which could be readily measured, were chosen as representative parts of the upper and lower body (Fig. 12).

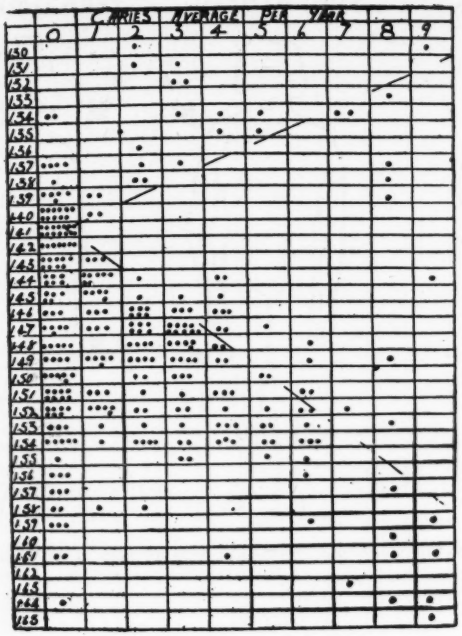
2. The distance from the wrist bone to the elbow prominence was taken and the distance from the ankle to the center of a fixed point on the knee was taken. These distances were arbitrarily divided into four sections of equal length, producing five proportionately spaced points.

3. At each of the points, circumferential measurements were taken.

4. Each leg measurement was divided by a corresponding arm measurement beginning with the ankle and wrist. These five quotients were added and divided by five. The resulting figure was termed the metabolic factor.

Application of Metabolic Factor—At first, only interpretation of the metabolic factor was used for diagnostic purposes. Prior to that the correlations had been determined between the metabolic factor, the body shape, and certain types of dental caries.

Metabolic Figure and Dental Caries—An illustration of the interrelationship of the metabolic figure to dental caries was achieved by plotting a figure from 328 patients on a chart (Fig 10).



The vertical columns from 0 to 9 represent the number of cavities each person, represented by a dot, had in one year. The left-hand column contains the amount obtained by dividing the sum of the leg measurements. A relatively free area extends outward in funnel shape from 1.410. From this it was deduced that the correct measurement might approximate this amount.

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Interpretation of Figure 10

The metabolic figures are in a column at the left. In a horizontal row at the top are a series of figures, beginning with "O," which represent the number of yearly cavities. A dot for each patient was placed on the line marked by his individual metabolic factor. In the column representing the number of yearly dental cavities found in that particular patient, another dot was placed. As a result of plotting these two factors in 328 female patients, a curious pattern emerged: The incidence of dental caries took the rough form of a "K."

Incidence of Caries—Fewest cavities were found in those people whose metabolic factor fell at the junction of three lines in the "K," between the figures of 1.400-1.420. At figure 1.410 there were 14 people without caries.

Women with a metabolic factor lower than 1.400 were found to be heavy above the waist and were apt to have subgingival cavities (sympathetic type). Those with a metabolic factor above 1.420 were found to be heavy below the waist and tended to have coronal cavities (parasympathetic type).

Absence of Caries—Twenty-one women with no caries, apparently in good health, with good figures, were measured. Their quotients were averaged, totaled, and divided by five with a resultant of 1.428. This closely approximated the 1.400-1.420 figure reached after graphing the metabolic figures with incidence of dental caries. It was therefore deduced that a metabolic factor between 1.400-1.428 meant good body proportions.

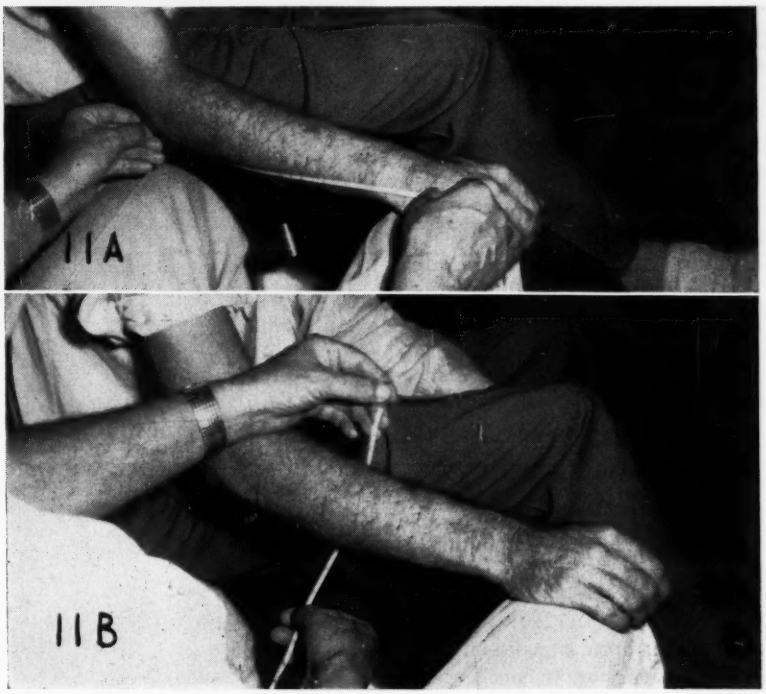
Sympathetic Glands Dominant—A resultant below 1.400 was taken as indicative of dominance of the sympathetic glands: thyroid, anterior pituitary, adrenal medulla, and gonads. Most of these people had a high blood phosphorus which could only be reduced by use of secretions from glands of the opposing *parasympathetic group.*

Parasympathetic Glands Dominant—A resultant above 1.400 was taken as indicative of dominance of the parasympathetic glands: Isles of

Langerhans of the pancreas, posterior pituitary, parathyroid, and adrenal cortex. In general, these people revealed a high blood calcium which could be reduced by use of secretions from glands of the opposing *sympathetic group.*

Significant Factors in Development of Technique—As the study evolved the metabolic figure assumed less importance and the original five quotients achieved greater importance. The plotting of these five quotients as a graph led to the development of the endocrine pattern.

Graph Interpretation Key to Endocrine Treatment—The validity of endocrine pattern interpretation is dependent on exact duplication of the measurement technique which was evolved over the past thirty years. There may be better ways of measuring but graph interpretations based on any other technique would be valueless. Graph interpretation is the key to endocrine treatment. Dependable graphs and exacting blood analysis techniques are basic to the successful use of this method. Faithful duplication of technique is, therefore, of vital importance.



11A. ***Shows the tape in position making a measurement from the elbow to the wrist.***

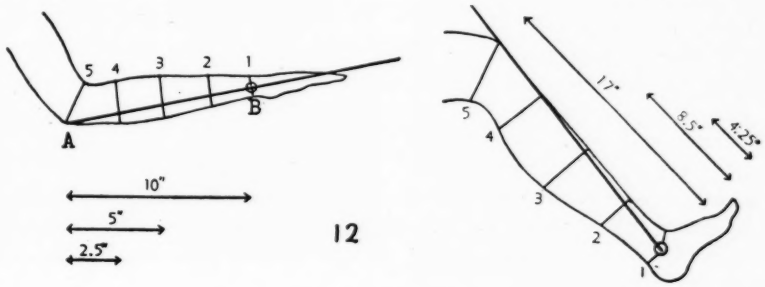
11B. ***The position of the tape for the middle circumferential measurement of the forearm.***

Technique in Measuring

The first requisite for the measurement test is a narrow, flexible tape, accurately marked in tenths of an inch. After considerable experience the authors have developed a tape which is affected but little by weather changes. (Most cloth tapes shrink and stretch; a steel tape is too stiff.) The tape used has a small hook on the end for ease in determining exact circumferential figures.

Two upright chairs are required, one for the operator, and one for the patient, as shown in Figure 11A.

Position of Operator and Patient—The operator sits at right angles to the patient, on the patient's right side. The operator should adjust his knee level so that the patient's hand can be placed on the operator's knee while achieving a 45°-bend of the patient's elbow. If the operator will rock his knee back and forth a few times, the patient will automatically relax the arm.



Step One in Procedure—Maintaining the 45°-angle of the arm, the operator catches the hook on the end of the measuring tape between his thumb and forefinger and locates the point of the elbow. (With a little patience the space between the bones at the elbow can be readily found.) The tip of the hook should be placed here and the tape stretched along the arm to the middle of the wrist bone (Figs. 11A, and 12, A and B). This length should be rechecked for accuracy and the figure recorded.

Step Two—Divide the measurement A-B (Fig. 12) by four; that is, if the total length is 10, the division is 2.5.

(Warning: It is important never to adjust the measurement figure to facilitate mathematical calculation. Small errors in the early steps lead to larger errors in the graph and will result in false endocrine interpretation. This must be avoided if success is to be achieved.)

Step Three—Having determined the figure representing one-quarter

Length right forearm 9.8			Quotients	Length right leg 17.0	
Circumferential Measurements	Wrist	6.55	A	1.03	Ankle
	one-fourth	7.7	B	1.17	one-fourth
	one-half	9.6	C	1.505	one-half
	three-fourths	10.05	D	1.485	three-fourths
	Elbow	10	E	1.603	Knee

13

14A. ***Shows the position of the foot at right angles to the leg and the tape in proper position for the measurement at the ankle bones.***

the total distance of the arm measurement, with assistance, mark the quarterly points (Fig. 12).

(Caution: Either an assistant must do the marking, or, if done by one operator, the full length from elbow to wrist must be taken at the time of *each* marking of a quarter. *Never*, for example, hold the tape at the hook and at 2.5 to mark the first quarter. *Always* take the whole measurement and mark, with the entire tape laid along the arm or leg. If the marking method is used, *always* recheck after marking and *before* obtaining the circumferential figures.)

Step Four—1. Starting with the circumferential wrist measurement, put the tape squarely across the middle of the wrist bone, with the figured side of the tape touching the skin. The open side of the hook should be to the right.

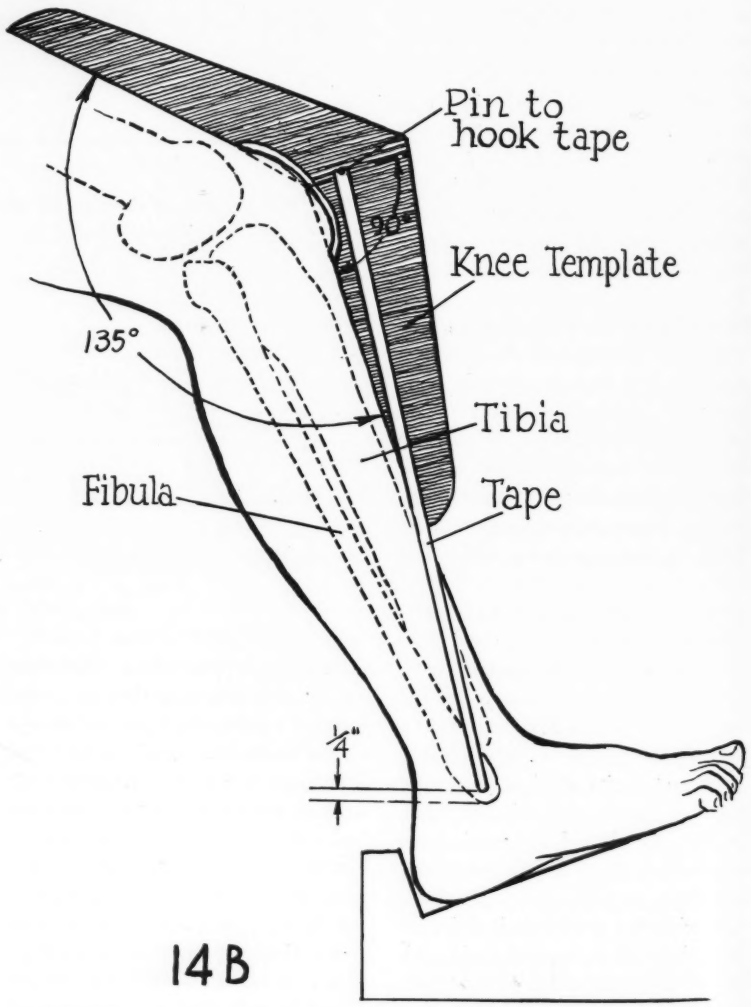
2. Encircle the arm, engage the tape in the hook, pull the tape gently (never make it tight), fold tape over hook, and press down.

3. Remove the hand. If the tape stays in place, and does not bind, take an exact reading, and record.

4. Place all arm measurements in the column with the arm length at the top of the column (Fig. 13).

Contact Measurement Required—Remember, the tape should not be tight. Only contact measurement is wanted.

Step Four Repeated—Repeat the technique described, placing the



14B. ***The knee template.***

14C. ***The knee template in position to assure a 45-degree angle from the horizontal and the lower leg from the ankle to the knee, marked at one-quarter, one-half, and three-quarter lengths.***

14D. ***Shows the position of the tape for the middle circumferential measurement of the leg.***

14E. ***Shows position of the tape for the three-quarter length circumferential measurement of the leg.***

proximal (toward the elbow) edge of the tape across the point of measurement on the next four marks. Record the circumferential measurement at one-quarter the arm length, one-half the arm length, three-quarters the length, and the elbow measurement.

Procedure in Leg Measurements

To measure the leg, the operator maintains a position at right angles to the patient. Place the patient's foot on a 45°-angle stool (Fig. 14A).

Ankle Measurement—1. With the foot at right angles to the leg, take the ankle measurement (Fig. 14A). Place the tape around the leg and across the middle of both ankle bones.

2. Check to be sure that the tape has not dropped at the back of the leg.

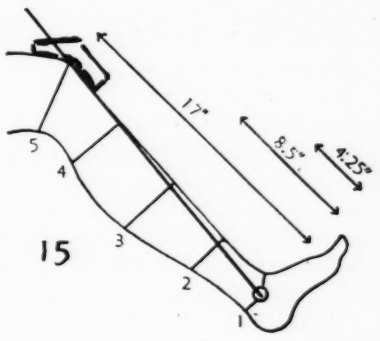
3. Record the measurements as before in a column with the leg length at the top and opposite the arm length. This will provide two columns of figures.

4. Leave ample space between the two columns (Fig. 13).

Leg Length Measurement—Give a formed 45°-angle (from a horizontal aspect) template to the patient (Fig. 14B). The patient himself must adjust this template so that the knee fits the curve and both straight surfaces of this device touch the leg. The upper side of the angle lies flat on the thigh and the lower side of the angle rests on the lower leg. If this is done there will be a 45°-angle at the knee. The exact point of juncture of thigh and foreleg will be in line with the juncture of the two sections of the template (Fig. 15). This juncture provides the starting point for the leg measurement (Fig. 14C). Mark this and proceed with the circumferential measurements of the leg in the same manner as that described for the arm (Figs. 14D and 14E). Repeat measurements for both sides of the body. This will supply two sets of measurements, one for the right arm and leg, one for the left arm and leg.

Errors in Measurement Technique—The following are the most common errors encountered in measurement technique:

1. Pulling the tape too tight. The measurement should be contact only,



allowing the flesh to fall naturally if flabby.

2. Inaccuracies in leg length calculations. The use of the template prevents this type of error.

3. Obtaining the middle circumferential measurement of the leg. This is a difficult measurement. The tape must go squarely around the middle (not slanting from front to back) and the upper or proximal edge of the tape should cross the exact half-way mark between the two extremes of the length. The fourth measurement is obtained by using the distal edge of the tape as if to measure a circumferential on a cone. With a tape having width the edge toward the base is the only one which measures accurately.

Note—Remember that the validity of graph interpretation depends on the accuracy of the arm and leg measurements.

Measurements Assembled

For the right and left sides of the body there are now two columns of figures: (1) those representing the arm length and four equidistant circumferential arm measurements, and (2) those representing the leg length and four equidistant circumferential leg measurements (Figs. 16 and 17).

Plotting the Graph—To obtain the figures for plotting a graph, each leg measurement must be divided by the corresponding arm measurement. This is most easily and rapidly done by using a slide rule for computing results. The quotients obtained are recorded in a column, one for the right, one for the left (Figs. 18 and 19).

Graph Founded on Relative Proportions—The quotients obtained by dividing each leg measurement by the corresponding arm measurement give the *relative proportions* of the leg to the arm. Because the graph is based on *relative proportions*, alterations in the patient's weight from time to time do not invalidate the graph interpretation. Add ten pounds, subtract ten pounds, the weight distribution is still controlled by the same mechanism. The relative proportions have the same endocrine significance (Figs. 18 and 19).

The next installment will describe the method of plotting the graph and the interpretation of the patient's endocrine pattern.

(*End of Part Two*)

2810 *First Street North*

Length right forearm 9.8		Quotients	Length right leg 1.70	
Circumferential Measurements: Wrist	6.55	A	1.03	Ankle
one-fourth	7.7	B	1.17	one-fourth
one-half	9.6	C	1.505	one-half
three-fourths	10.05	D	1.485	three-fourths
Elbow	10	E	1.603	Knee

16

Left forearm 9.7		Quotients	Length Left leg 1.72	
Wrist	6.25	A'	1.01	Ankle
one-fourth	7.3	B'	1.12	one-fourth
one-half	9.1	C'	1.48	one-half
three-fourths	9.8	D'	1.48	three-fourths
Elbow	9.9	E'	1.69	Knee

17

Length right forearm		Quotients 1.735	Length right leg	
Circumferential Measurements: Wrist		A 1.574		Ankle
one-fourth		B 1.520		one-fourth
one-half		C 1.565		one-half
three-fourths		D 1.476		three-fourths
Elbow		E 1.603		Knee

18

Left forearm		Quotients 1.775	Length Left leg	
Wrist		A' 1.615		Ankle
one-fourth		B' 1.534		one-fourth
one-half		C' 1.626		one-half
three-fourths		D' 1.510		three-fourths
Elbow		E' 1.625		Knee

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"3-D" *Dentistry*

HENRY FISCHER, D.D.S., New York

DIGEST

This article contains a timely and useful analysis of the third dimension or depth perception in photography which as applied in dentistry can be a valuable aid in diagnosis and in recording important facets of a case history.

Evolution of Third Dimension in Photography

"3-D" is the third dimension which is depth perception. Since ancient times man has been preoccupied with the problem of applying the third dimension of depth on a two-dimensional surface of length and breadth. Euclid worked on the problem in 280 B.C. In the 16th century artists made stereoscopic drawings called anaglyphs. After the advent of photography, stereo became popular in the late 19th century. With the competition occasioned by television, 3-D has been adopted by the motion picture industry as their particular innovation and additional developments are inevitable with the increase of interest in this medium.

Form of Records in Dentistry—If an unusual case is encountered in dentistry and it is desired to record it, there are several means of communication possible:

1. The situation can be described in words.
2. A black and white picture can be taken.
3. A color picture can be made.
4. A stereograph can be used.

In reproducing the actual situation seen, color stereo comes closest to the reality.

Analysis of Vision

For the study of stereopsis, the human eye is the best model. The eye is a miniature camera.

Mechanism of the Eye—The working parts of the eye include a diaphragm, lens, film back, and stereoattachment. The diaphragm is the iris which can open to let in more light, and contract when the light is too intense.

The Lens—Set in back of the iris, the lens has muscular attachments which allow it to focus from about six inches to infinity. To focus on near objects the lens becomes more convex through a complicated series of reflex movements. This is called accommodation.

Adjustable Lens Absent in Camera—No camera has been developed with an adjustable lens. In a camera the lens is moved forward or backward for focusing; the eyeball is too small for this movement.

The Film Back—The retina which is the film back is more like a television camera because the picture in color and with depth is flashed electrically to the brain.

The Stereoattachment—The eyes, set at an average pupillary distance of 2½ inches, form the stereoattachment. In a stereocamera this situation is fixed. Human eyes are not stationary, however, but can converge when necessary to focus on a near object.

Process Duplicated—The process of converging is called "toeing in" and has been duplicated in one of the new developments in stereo by the Natural 3-dimensional camera through the use of mirrors. This contributes to more realistic stereopictures which can be viewed with no eyestrain.

An Intricate Apparatus—From the brief analysis of vision presented it can be seen that the human eye is an intricate combination of camera, television, color, stereo, motion picture, wide angle, and telephoto apparatus which as yet has not been duplicated by man.

Binocular Vision

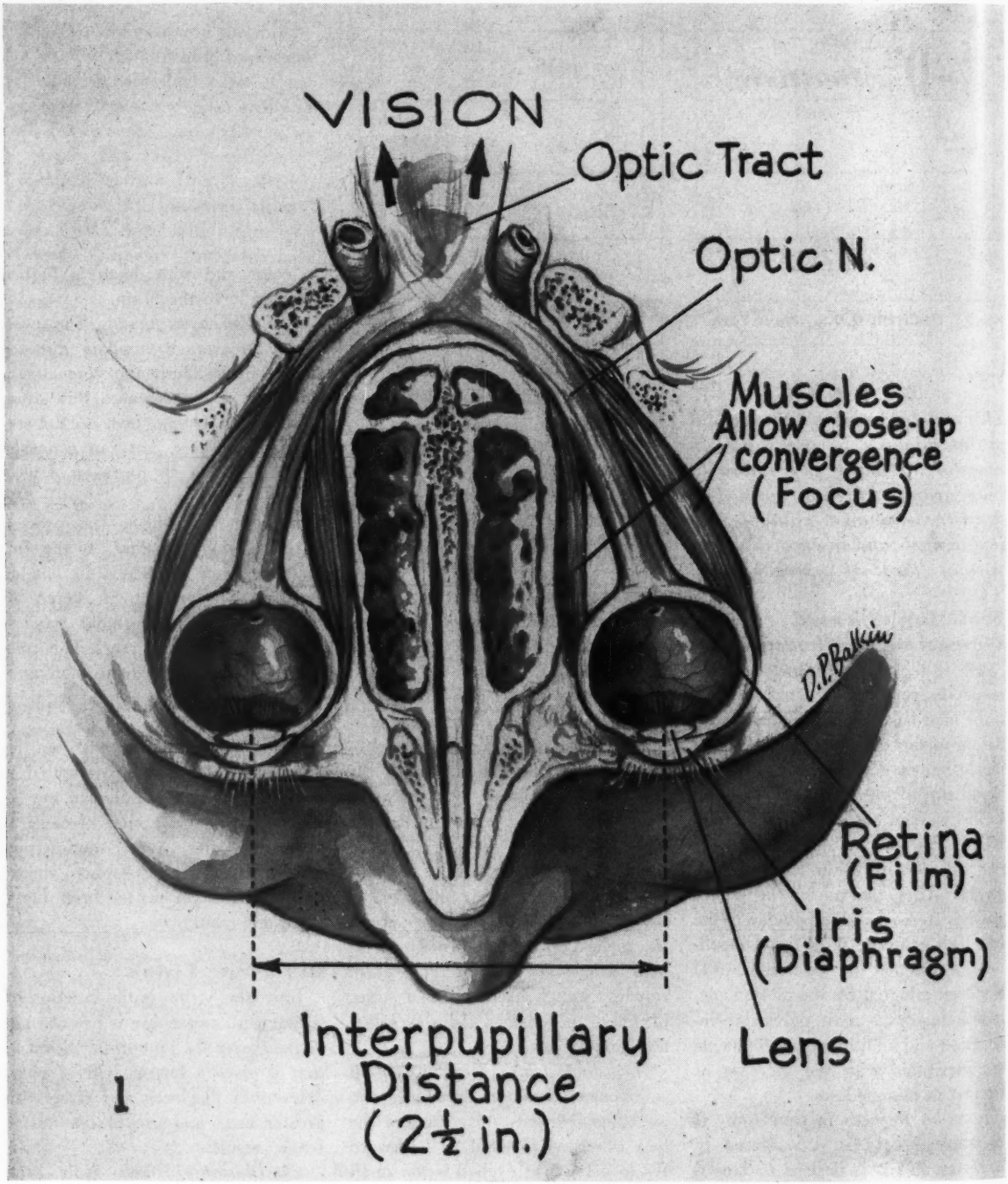
Binocular vision is the function of seeing with two eyes; it has the advantage over the monocular vision in that it gives a larger field of view, determines distances and sizes with greater ease, and provides a stereoscopic result.

The Illusion of Depth—It has been noted that certain conditions must prevail in order to obtain the illusion of depth. These conditions are the following:

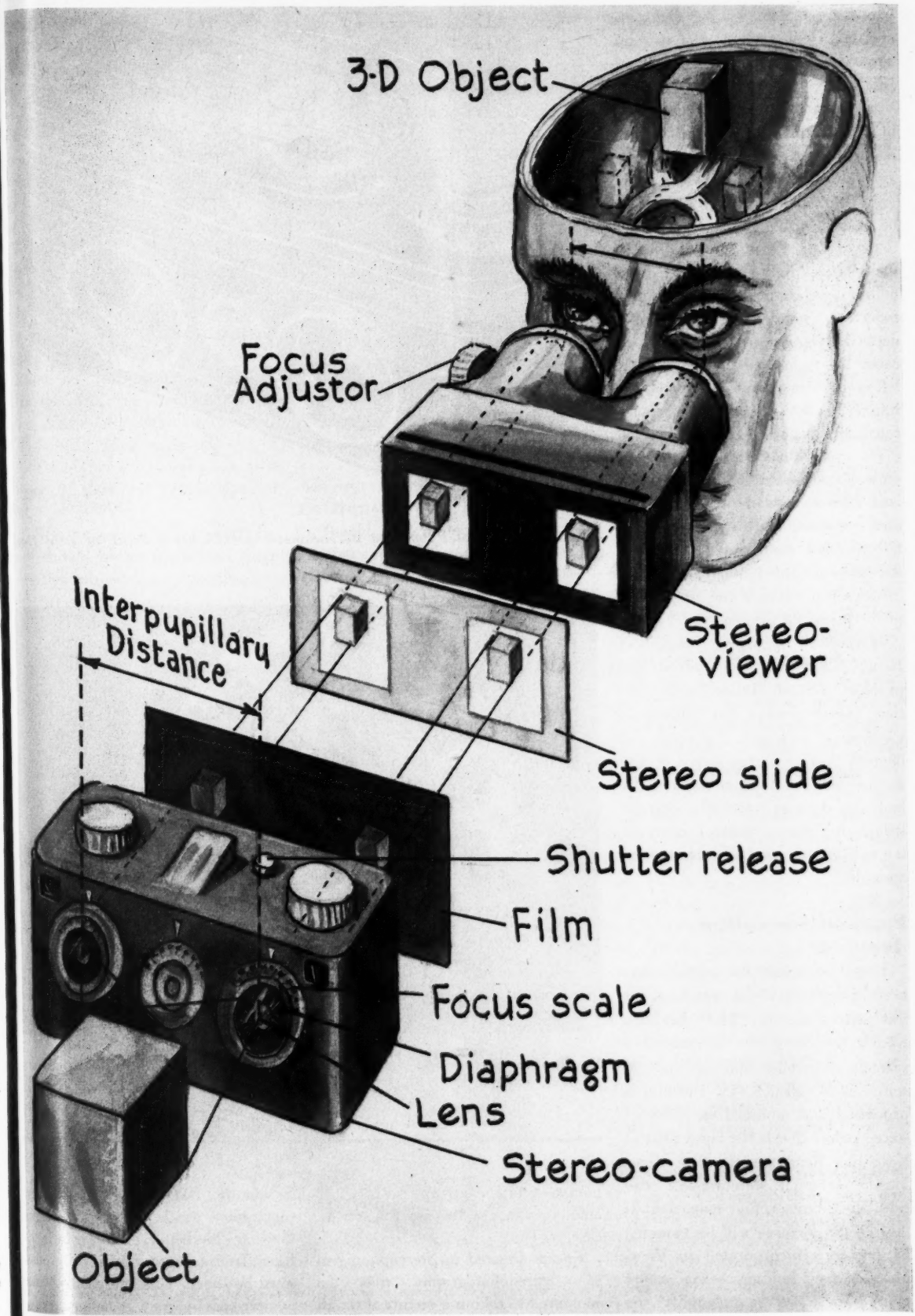
1. If a right-eyed image of an object is thrown on the right eye and simultaneously a left-eyed image is thrown on the left eye, stereovision results. The images are slightly different on the two retinas because of the angular differences from the point of view of each eye.

2. This situation is duplicated by man with the stereocamera which takes two pictures: a right-eyed one, and a left-eyed one. Each picture is mounted in a stereoslide which has two windows set at an interocular distance of approximately 2½ inches between center lines of cut transparencies.

3. In a stereoviewer the left eye



1A-1B *A comparison of human vision and stereophotography. Man gains depth perception because he sees with two eyes. In stereophotography pictures are made through two lenses separated by the interpupillary distance. The resulting pictures are seen through a binocular viewer to be interpreted by the brain in the third dimension of depth.*


3-D Object
Focus Adjustor
Interpupillary Distance
Stereo-viewer
Stereo slide
Shutter release
Film
Focus scale
Diaphragm
Lens
Stereo-camera
Object

sees the left picture; the right eye sees the right picture. The two images combine visually to give a realistic view of the original subject.

4. Unless all corresponding points in both pictures line up horizontally, one eye looks up while the other eye looks down.

5. All similar vertical lines must be parallel in both pictures.

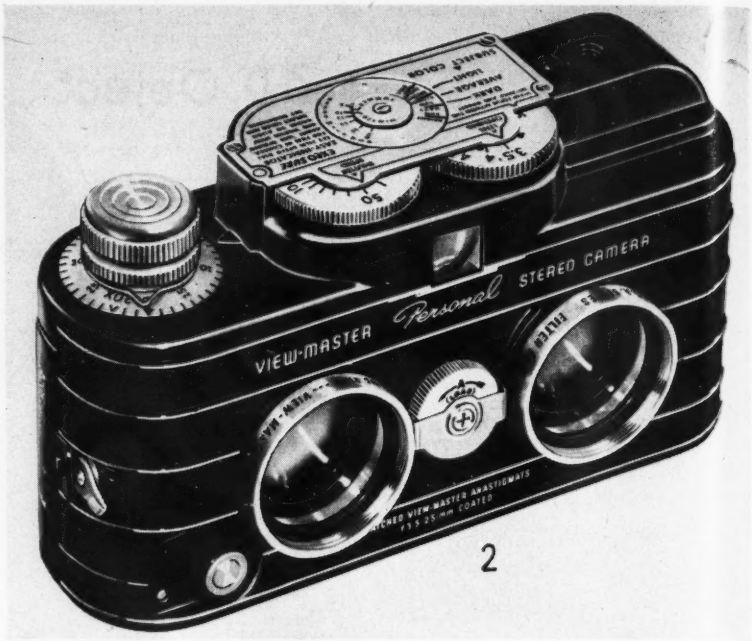
Factor of Depth Perception—If the polarized light system is used and both images are projected on a highly reflecting nondepolarizing screen, depth perception will not occur because the right-eyed picture and the left-eyed picture are overlapped, the infinity of both pictures being separated approximately 2½ inches.

Use of Polarized Glasses—To obtain a stereoscopic picture, polarized glasses must be worn so that each eye sees its own image. This fulfills the first condition requisite for stereovision. The important problem in stereoprojection is the elimination of the polarized glasses.

Method of Supplying Illusion of Depth—Cinerama has solved the problem of depth illusion by eliminating glasses except for stereopsis. Cinerama gives the impression of depth by using a large screen of 146 degrees angle of vision horizontally and 55 degrees vertically thereby stimulating the peripheral zones of the eyes which tend to look around an object.

Types of Stereofilm Available

Thirty-five-millimeter color has been accepted as the standard for the stereocamera. The Eastman Kodak Company has announced a special stereofilm loading for 20 stereo pairs called K335. The film is processed and mounted in slides of stereo pairs; this is the equivalent of Kodaslide Readymounts. The View-Master personal stereocamera also uses 35-millimeter film magazine. If desired the pictures will be mounted by Sawyer's Incorporated in View-Master reels holding seven stereo pairs. These services simplify the mounting of stereograms so that any amateur can use the apparatus with ease.



2. ***The View-Master Personal stereocamera at f/16 has a depth of field from four feet to infinity.***

3. ***Manner of mounting View-Master reels. The pictures can be placed in any sequence desired.***

Effects Desired in Stereophotography—Stereophotography may be compared to taking a picture through a window frame. The composition must have depth. The more planes there are the better. All objects in the frame from foreground to background must be sharp. This can easily be accomplished by zone focusing.

Problems of Stereoscopic Pictures in Dentistry

1. Most stereoscopic pictures in dentistry should be taken close to reveal all the necessary detail. This is the most difficult branch of stereo. The problems are similar to those in taking close-ups with a regular camera, and close-up attachments are required.

2. The interocular distance is also a problem. The eye takes care of this by convergence. A close-up attachment now on the market solves this problem by the use of wedge-shaped prisms.

Rules in Interocular Distance—1. In general, the interocular distance should be 1/50th of the lens-to-the-subject distance.

2. The closer the camera is to the subject the narrower is the depth of field.

3. The subject-to-background distance should be no more than three times the subject-to-camera distance. With the standard stereocamera and close-up attachments two feet is probably the most satisfactory working distance. Closer distances require special equipment.

4. A stereo sliding board can be made or purchased which allows for a straight shift of a stereocamera or a single lens camera. The board must be firmly mounted and the subject to be photographed must be stationary.

Interocular Measurements—The interocular distance and subject-to-lens distance must be accurately measured according to the following table:

Lens to Subject Distance in Inches	*Lens Separation in Inches*	*Diopter Lens Attachment*
30	2.0	1
27	1.8	1
24	1.6	1
21	1.4	1
18	1.2	2
15	1.0	2
12	0.8	3
9	0.6	4
6	0.4	6

Stereocamera for Use in Dentistry

The ideal stereoscopic camera for dentistry would be one that has a variable interocular separation between the two lenses in addition to axial lighting. As substitutes a number of cameras are available:

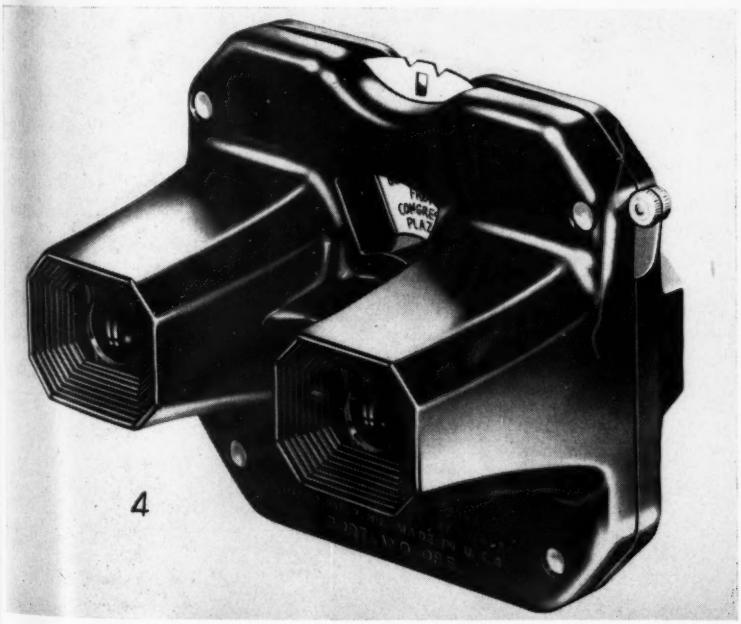
1. The first camera to be obtainable was the Stereo-Realist. For a long time it was the only one offered.

2. Because of the increased interest in stereo, within the last few years several cameras have been developed. The Revere Company supplies a camera similar to the Realist.

3. Sawyer's Incorporated, which successfully sponsored the View-Master reels of different subjects from all over the world, has an excellent camera which is economical to operate. The stereograms are mounted in a circular reel of seven pairs which is the only way of composing and automatically viewing stereographs.

4. Other useful cameras are the Busch Verascope, the Videon Camera, and the Iloca. The Stereo-Tach is an attachment that can be placed over a single lens camera to give a stereogram. The disadvantage is the smallness of the pictures and the use of mirrors which cuts down the light.

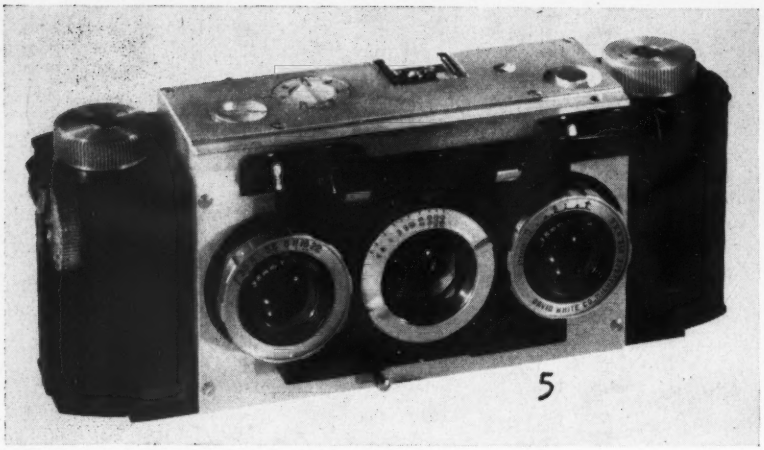
Two Cameras May Be Used—Strictly speaking a stereocamera is not needed to take stereo pictures. The use of two cameras with the same focal length lens and mounted at an interocular separation of 2½ inches will result in stereo pictures.



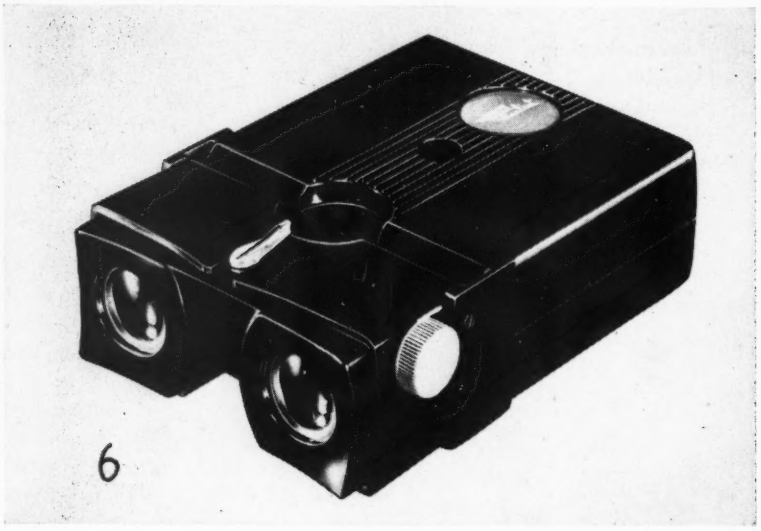
4. *The View-Master viewer is inexpensive and easy to operate. Pressing the lever automatically changes the picture.*

Books on Subject Available

Sawyer's Incorporated has cooperated in publishing an original series of books, *The Stereoscopic Atlas of Human Anatomy*. The first book in the series deals with the central nervous system and contains 34



5. *The Stereo-Realist is the pioneer in stereophotography.*



6. *By pressing the button on the top of this stereoviewer, illumination is provided for viewing the color transparency stereoslide.*

View-Master reels which are correlated into the text. Six additional volumes are in preparation. In the future dental books following the same pattern may be published.

111 *East 167th Street.*

Fluorosis in the Sudan

A FOCUS of endemic fluorosis was discovered in the Sudan during an investigation into health and nutrition at Abu Deleig in the Butana desert in December 1952. During the examination of schoolboys, aged seven to fourteen years, many instances of abnormality of the dental enamel were noted. These were characteristic of fluorosis and were provisionally diagnosed as such. Grade 1 changes included white, opaque, chalky areas of the enamel of permanent teeth that were most commonly seen on the cusps of premolars and first molars and on the distal half of the central and lateral incisors. Grade 2 changes included dark yellow-brown discoloration, often in a pattern of broad horizontal bands or wavy parallel lines, that were most prominent in the upper incisors. Grade 3 changes were pitting and mottled discoloration of the enamel, mainly on the incisors. Grade 1 changes were found in 39.6 per cent of 134 boys, grade 2 in 17.1 per cent, and grade 3 in 3.7 per cent, the total incidence being 60.4 per cent. The incidence of caries was low. The incidence of dental fluorosis in adults was similar to that in the children. Nine out of 10 samples of well water contained fluorine in concentrations between 1.10 and 4.00 parts per million.

From Medical Literature Abstracts, *Journal of the American Medical Association* **152**:1179 (July 18) 1953.

The EDITOR'S Page

ELECTROLYTIC action between dissimilar metals with the saliva acting as the electrolyte or conducting medium is a phenomenon encountered in dental practice. Clinicians are not in agreement regarding the effects of such action. An imposing list of signs and symptoms have been ascribed to electrogalvanism.

Lain, a dermatologist, was among the first who made extensive observations in this field and listed a number of clinical conditions that he thought were produced or were aggravated by the flow of electric current between dissimilar metals used in dental restorations. Mumford[1] credits Lain and his colleagues with this list:

Symptoms

(1) A metallic taste which usually appears immediately after the restorations are made. After a time this taste may disappear or at least cause no discomfort.

(2) An increase in salivary secretion.

(3) A burning or tingling sensation in the mouth, especially at the tongue margins, and normally intermittent.

(4) Pulp sensitivity when dissimilar restorations come into contact.

(5) Discomfort in the mouth, irritability and indigestion or loss of weight.

(6) Neuralgia of branches of the trigeminal nerve.

Signs

(1) Disintegration and discoloration of restorations.

(2) Decomposition of dental cement (which contains a high percentage of zinc).

(3) Erythema of the mucosa.

(4) Prominence and sensitivity of the lingual tonsils.

(5) Ulceration of the buccal mucosa, with denuded patches and geographic areas upon the dorsal and marginal areas of the tongue.

(6) Leukoplakia.

(7) Rarely, pathologic changes in the blood and kidneys, probably caused by absorption of toxic metals.

Mumford's investigation was concerned with galvanic action and pain. He disregarded the other conditions attributed to this phenomenon. He showed that there are two electrolytes in the oral tissues through which current may be conducted: the saliva, and the tissue fluids in bone, dentine, and soft tissues. When two metals, amalgam and gold for example, touch, either by proximal or occlusal contact, a flow of current up to 18 microamperes may be produced. The pathways of conduction are: from gold to silver *directly;* from silver to gold through the *electrolytes in the saliva and tissue fluids.*

The difference in potential between gold and silver may be as much as 600 millivolts. The greater the difference in potential, the greater the magnitude of the current and the greater the likelihood of pain being produced.

Dentists are aware that painful sensations are more likely to occur soon after the insertion of dissimilar metallic restorations. It is suggested that age changes, particularly in amalgam, alter the surface layer in a way to lower the electric potential so that a current of lower strength is produced.

Dissimilar restorations are considered in three groups:

"(1) Those that never touch each other. According to this hypothesis these should not lead to pain and the writer does not know of any case where they have.

"(2) Those that remain in contact. These may lead to pain on insertion of the second restoration but should not do so thereafter. This pain might at times have occurred and been attributed to cold or acid cement.

"(3) Those that come into intermittent contact. The way in which these may cause pain has been described. When they separate, the potential difference re-develops and may again cause pain on contact, but eventually pain fails to occur."

There are artificial and natural barriers that resist the passage of electric current: "Insulating linings, sclerotic zones, calcified barriers, and secondary dentine."

Variations in the electrolytes in the saliva and tissue fluids should be considered. The transitory pains that patients frequently experience in teeth that by clinical examination appear to be normal may be explained on the basis of changes in the electrochemistry of the saliva. Changes in the electrolytic nature of the saliva represent changes in the precursors of the saliva and tissue fluids—the blood.

[1]Mumord, J. M.: Electrolytic Action in Conservative Dentistry and its Relationship to Pain, Brit. D. J. **94**:256-260 (May 19) 1953.

A Removable, Adjustable Pontic

in FIXED BRIDGE CONSTRUCTION

NATHAN COHEN, D.D.S.,
and PHILIP KOHLER, Brooklyn, N. Y.

DIGEST

The author of this article has devised a method for constructing a pontic for fixed bridges with teeth that can be removed without disturbing the framework of the bridge. The operator is thus enabled to gain access to otherwise inaccessible areas, facilitating necessary corrections in the teeth or the tissue involved. Detailed directions for construction of the pontic are given by the author's collaborator, a dental technician.

Factors in Fixed Bridges

Most dentists have at one time or another had unsuccessful results with fixed bridges, despite thorough planning and conscientious construction. The following are some of the disturbing conditions which may arise:

(1) Irritation of tissue underneath pontics to a degree where the irritation becomes a focal point for a generalized Vincent's infection, making it necessary to remove the bridge.

(2) Excessive pressure, causing severe hypertrophy and bleeding from the tissue beneath the pontic.

(3) Recession of the tissue under the pontics, so that the area becomes a food trap and a source of irritation to the patient.

Difficulties Overcome — These sources of serious conditions have been overcome by constructing fixed bridges with removable and adjustable pontics. This method gives the operator access to otherwise inaccessible areas, thus making it in many instances unnecessary to remove the bridge.

Operative Innovation — In constructing the bridge, abutment preparations are optional with the operator. The significant change in method is in the pontic teeth, which can be removed by the dentist while the framework of the bridge remains cemented in the patient's mouth.

Deviations from Conventional Procedure

Instead of employing the customary methods of securing the pontic to the gold casting, the completed bridge constructed by the author, as shown in the illustrations, consists of the following deviations:

1. The plastic tooth has within it a bushing, extending from the occlusal surface to 2 millimeters from the gingival area and passing through the center.

2. A screw fits this bushing and extends through the gold occlusal casting down to the end of the bushing.

3. The screw is countersunk with a small head in the occlusal casting.

Removable Plastic Tooth—Before the bridge is cemented into the mouth the plastic tooth is fitted to the casting and screwed in tightly. Should the dentist consider it advisable at any time he can easily unscrew the facing, tap it gently from the lingual, and remove it while the entire framework of the bridge still remains in the patient's mouth.

Means of Correction Simplified—The dentist now has access to the margins of the abutments so that incipient caries can be arrested. Access to the tissue is also possible so that necessary corrections can be made in the pontic. When all corrections have been completed, the pontic can be secured firmly in position.

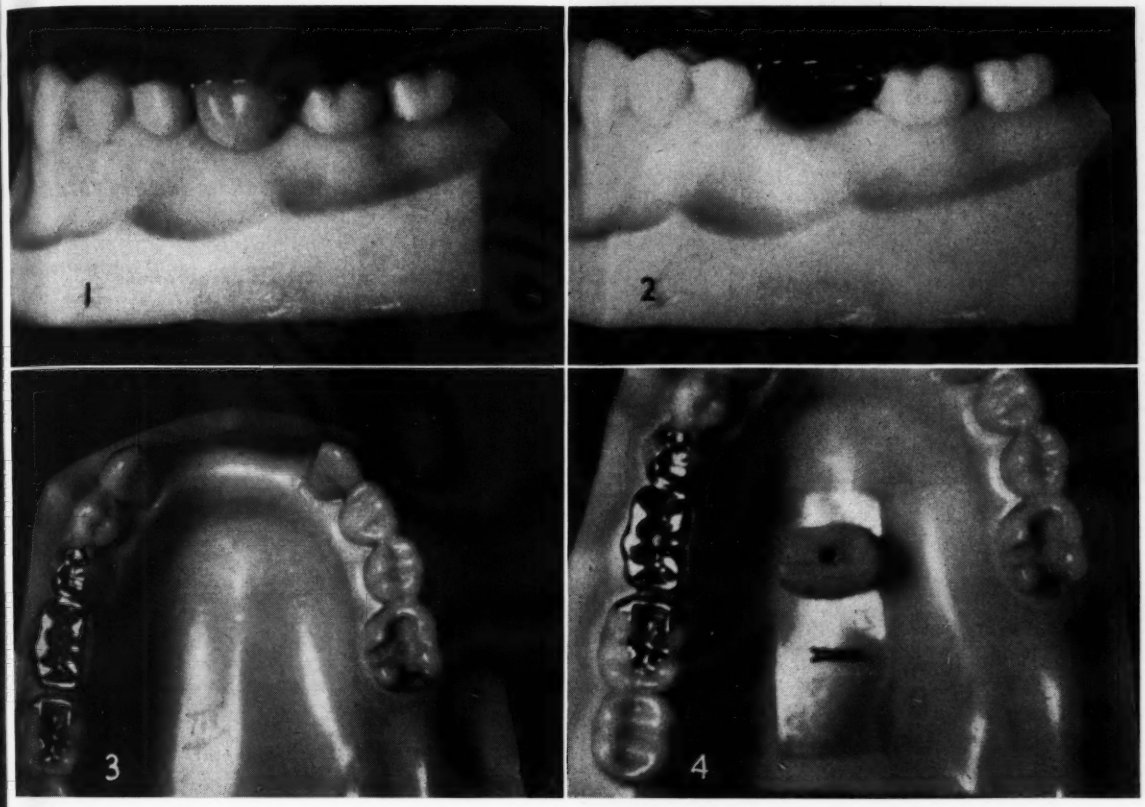
Previous Obstacles Eliminated—With the cooperation of a dental technician the author has constructed numerous fixed bridges, some with one pontic, some with more. If properly constructed, there is no seepage whatever. These bridges were inserted several years previously; the pontics have been removed and carefully examined and it is demonstrated that the obstacles formerly encountered have been overcome.

Procedure for Construction of the Pontic

The method of construction of the pontic, described by Philip Kohler, dental technician, includes the following steps:

1. The occlusal gold cusp is waxed up in the conventional manner except for a 15-gauge hole cut through the center of the cusp.

2. The threaded screw, which has a head approximating a Number 8 round bur, is set in the hole and countersunk in position in wax pat-



1. ***Missing upper right first molar is replaced by an adjustable removable pontic as part of a fixed bridge using inlays as abutments in second bicuspid and second molar. Buccal view; bridge cemented into position.***

2. ***Buccal view; pontic removed; framework of bridge remains cemented in position.***

3. ***Occlusal view.***

4. ***Occlusal view, showing threaded opening in occlusal gold casting for reception of screw. Also shown is plastic pontic with threaded bushing incorporated therein, and screw for attaching gold casting to plastic pontic.***

tern to a definite seat, and removed.

3. The waxing is invested, cast, and trimmed and connected to the abutments.

4. The screw is set in position in the finished casting and cut off about 2 millimeters from the ridge.

5. The bushing is fitted to the screw up to the under-surface of the gold cusp.

6. The bridge is now ready for waxing for the acrylic pontic. After waxing is completed, the entire bridge is invested for processing.

7. The pontic is finished, the bushing incorporated within.

8. The pontic is polished and screwed into position.

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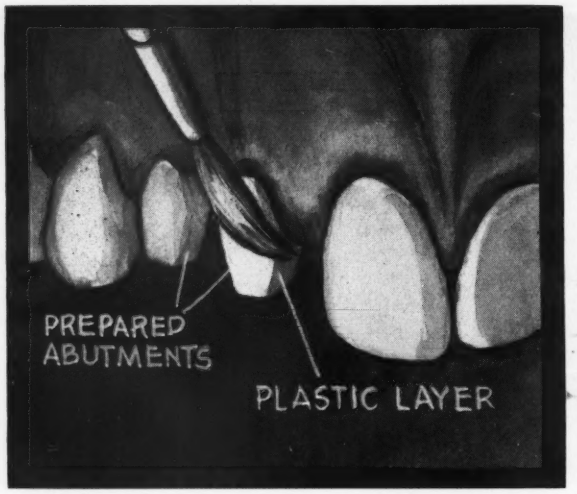


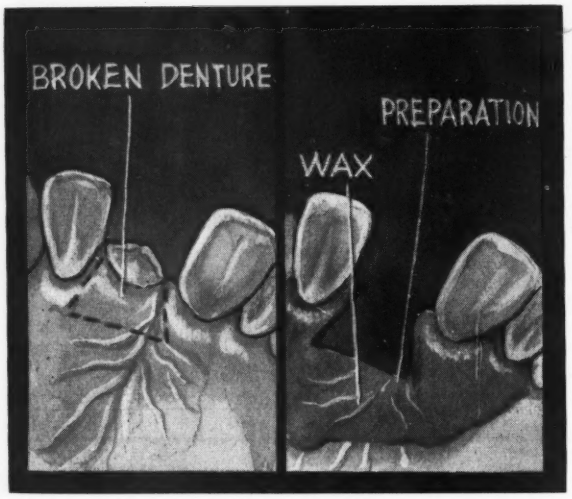
1

Clinical and Laborato

Temporary Covering of Crown Preparations

Robert R. Goodhart, D.D.S., Philadelphia

1. As a temporary covering for a crown preparation paint one of the self-curing acrylics on the tooth, using the Nealon brush procedure.

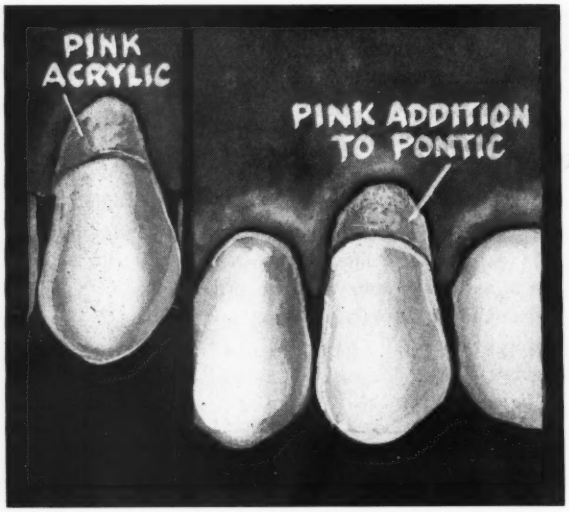


2

Finishing a Cold Pack Denture Repair

C. W. Fain, Jr., D.D.S., Daytona Beach, Florida

2. Flow a thin layer of wax over all the areas of the denture to be repaired before making the preparation. The acrylic repair material will not adhere to the wax making it a simple procedure to finish and polish to the original contour of the denture.



3

Gingival Restorations in Cases of Recession

David J. Manberg, D.D.S., New York

3. In cases of severe gingival erosion with recession, prepare the cavity in the usual manner and use the brush technique to restore the tooth with self-curing *pink denture base* acrylic. This procedure may also be used in cases of long bridge pontics to improve the esthetics.

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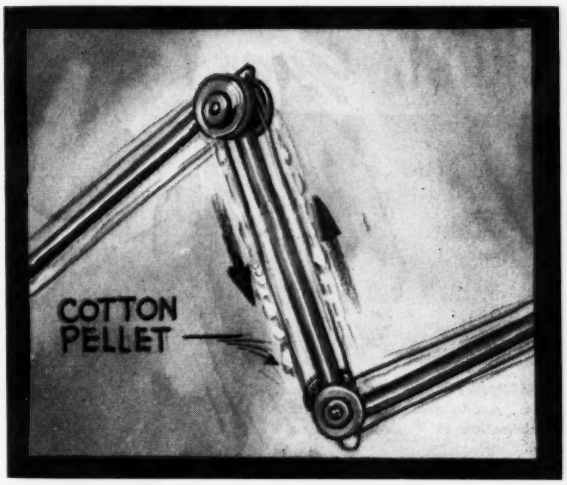
SUGGESTIONS . . .

Distracting the Child Patient

Allen J. Gardner, D.D.S., Oakland, California

1. Fasten several small pieces of cotton on the engine belt about 18 inches apart. When the belt rotates, ask the child to watch the "rabbits" chasing one another. This will tend to take his mind off the dental manipulations.

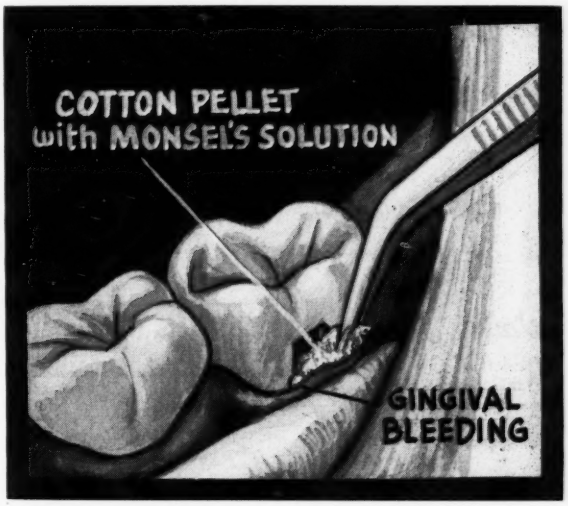


4

Control of Gingival Bleeding

S. Joseph Bregstein, D.D.S., Brooklyn, New York

5. Dry the bleeding area with a pledget of cotton. Apply a pledget of cotton moistened with pure hydrogen of peroxide. Dry the area and touch it with Monsel's salt solution applied on cotton. Pack well against the bleeding area. After two minutes wash the darkened debris with peroxide and continue the operative procedure.

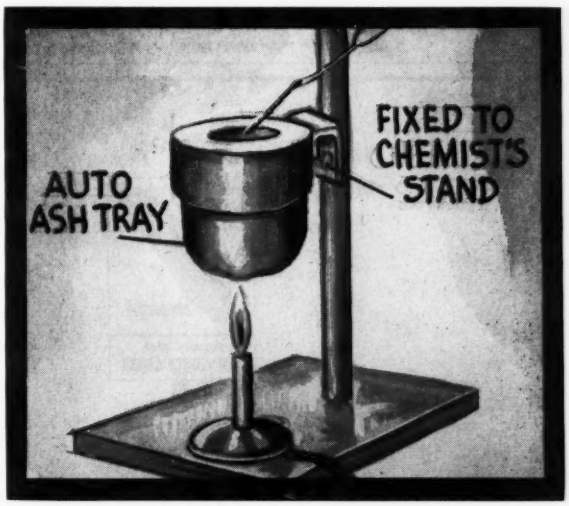


5

An Endodontic Instrument Sterilizer

Bernard Jacobs, D.D.S., Syracuse, New York

6. Remove the rubber suction cap from an automobile ash tray. The tray is fastened to a suitable metal stand and placed over a Bunsen burner. Melotte's metal or bar solder is melted in the tray. Broaches, reamers, and files are dipped in the molten metal to be sterilized.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 466 for a convenient form to use.

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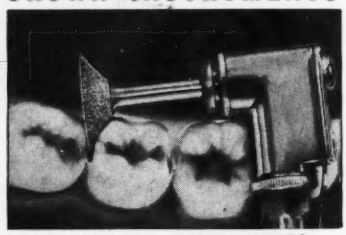

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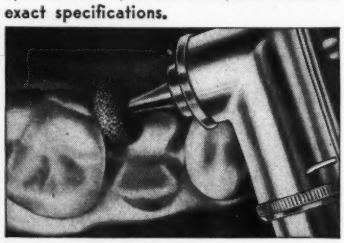

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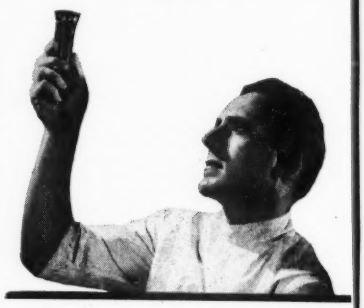
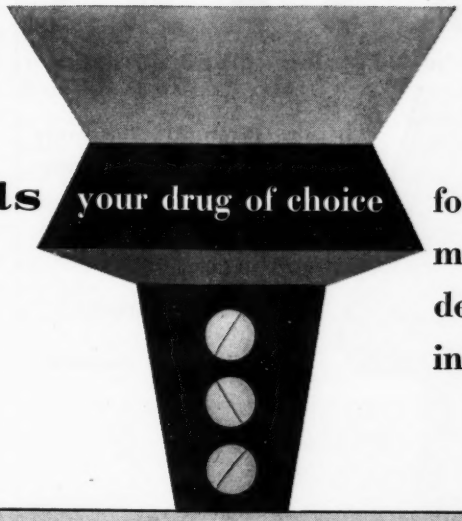


Tinnitus Aurium

"Ringing in the ear"—tinnitus is a common symptom. It is, however, a most puzzling complaint. The condition involves one or both ears or may be heard by the patient throughout the head with no specific location.

The character of the sound varies considerably and has been described as being like the sound of escaping steam, a whistle, a high-pitched bell, or running water, or as a roaring, buzzing, hammering, or rushing. The patient is sometimes conscious of tinnitus only during waking hours or when in a quiet room. At times it is a distressing disturber of sleep.

The condition is rarely due to any single and specific cause. Being a symptom and not a disease, tinnitus may be encountered in any form of ear disease: (1) as a result of impacted cerumem in the external auditory canal, (2) eustachian tube obstruction, (3) chronic nonsuppurative otitis media, (4) at times acute otitis media, (5) otosclerosis, (6) nerve deafness, and (7) Meniere's disease. It is believed that tinnitus is



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Group D		A — combine — A		B	C
Other Groups		A		B	B
Streptococcus viridans		A		B	B
Staphylococcus	B	A	B	A	B
Pneumococcus	B	A		B	B
C. diphtheriae		A (plus serum)		B	
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also associated with (1) changes in intratympanic pressure, (2) blood pressure and spinal fluid pressure, (3) spasm in intratympanic muscles, and (4) edema and hyperemia within the eighth nerve structure itself.

Tinnitus is also a symptom of a number of general diseases which indirectly affect the ear through the circulation. It is a common symptom with hypertensive cardiovascular involvement and the various forms of anemia. Certain drugs, such as quinine and salicylates, as well as excessive and prolonged use of alcohol and tobacco, cause tinnitus. Head trauma, intracranial tumors and various diseases of the central nervous system involving the auditory nerve are additional factors which contribute to the condition.

Because of the complicated etiology, the treatment of tinnitus is frequently difficult and unsatisfactory. Many times the etiologic factor cannot be found and often the factor cannot be remedied. On the other hand, tinnitus disappears spontaneously without apparent reason in many cases.

Innumerable medicaments have been proposed but none has been universally satisfactory. It is believed that most patients respond well to vasodilators of which nicotinic acid is generally the most satisfactory. It can be given over long periods intramuscularly or orally. Various surgical procedures have been attempted with varying degrees of success and failure.

Fabricant, Noah: Medication in Diseases of the Inner Ear, Mod. Med. **20**:124-133 (*March* 1) 1952.

Curare in Poliomyelitis

The orthopedic treatment of poliomyelitis strives to prevent deformities and to restore power to muscles seemingly paralyzed. Treatment in the past was based on the principle that if a muscle were paralyzed, its normal opponent would overpull it and force the involved part into an attitude of deformity. Casts and braces

were applied to prevent this. Despite such apparatus deformities continued to develop.

Kenny's concept is that the overpulling opponent of the paralyzed muscle is not normal but itself in a spasm or tightness. Her theories aroused controversy, but also stimulated research which confirmed on an electro-myographic basis the presence of irritability or spasm in the acute phase of poliomyelitis in most of the muscles of the body. Research also demonstrated that the hot packs which she advocated did not lessen the spasm.

Some investigators used curare to lessen the irritability and permit restoration of muscles to their normal length by stretching. Curare is injected intramuscularly three times a day. Approximately three quarters of an hour after the two daytime injections, a physical therapy technician stretches all the joints of the body through an ever-increasing range. At the same time the patient is urged to exercise and to walk if possible. When the orthopedic examination reveals complete relaxation, the curare is stopped.

With this method casts and braces are unnecessary in most cases. If complete relaxation can be obtained and maintained following discharge from the hospital, deformities do not develop. The patient must continue the stretching for a long time after the acute phase has ended.

Raisman, V.: *Orthopedic Treatment of Acute and Subacute Poliomyelitis with Curare and Stretching*, *New York State J. Med.* **52**:1147-1150 (*May* 1) 1952.

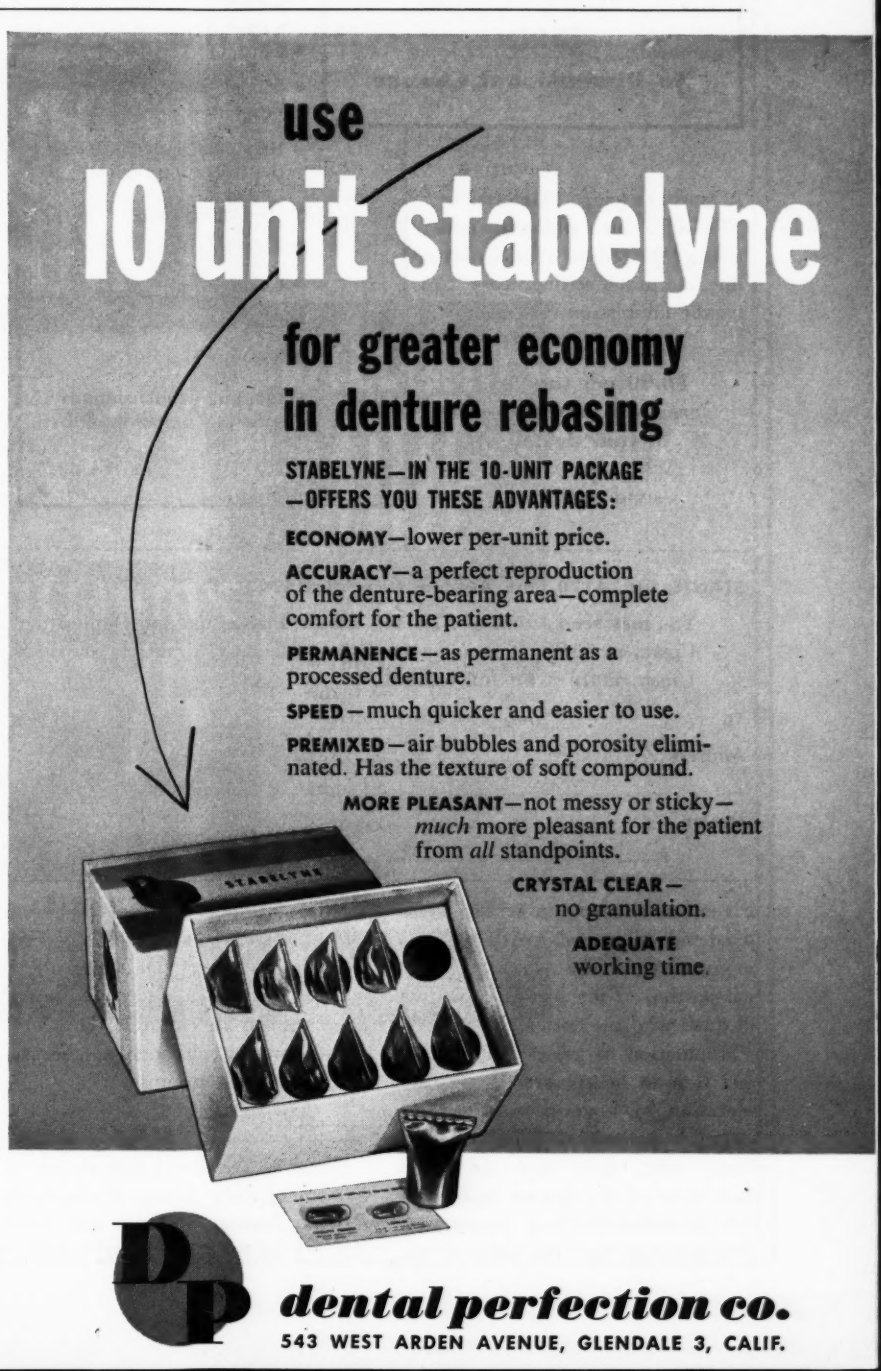
Stimulation of Growth in Long Bones

A technique by which differences in limb length in children may be corrected by arrest of growth of the longer bone or stimulation of growth in the shorter has recently been reported.

Local stimulation of bone growth results when ivory screws are inserted near the epiphyseal cartilage. Daily for one month prior to the operation, a teaspoonful to a tablespoonful of phosphorized cod liver oil is given to the child; the dosage depending upon the age. Ivory screws or pieces of ivory are sterilized by being placed in 95 per cent alcohol and autoclaved under 15 pounds of pressure for one hour.

After a lateral longitudinal incision has been made at the end of the bone, just enough of the periosteum is stripped to permit drilling the holes. Although the incision is made in the epiphyseal plate region, it is not only unnecessary to expose the cartilage, but it is recommended that the plate be avoided. Not one complication has arisen from this approach. Too much trauma at the site of the ephiphyseal plate may arrest growth.

The drill should be at least 1/64 inch smaller than the screw. After the depth of the drill hole has been determined, a mark is made on the proximal portion of the screw to indicate how far the screw must be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driven into the bone in order that its distal end will extend just through the opposite cortex. The remaining proximal portion of the screw is then cut off flush with the cortex.

Stimulation of growth follows the operation in nearly every case. Acceleration of bone growth has occurred in patients with poliomyelitis three, four, five, and six years after onset of the disease coincident with growth-stimulating procedures. This suggests that the cells in the cartilage columns of the epiphyseal plate have not undergone degenerative changes during these periods.

Much remains to be learned about bone growth in children. These reports, however, although not numerous, hold great promise.

Pease, C. N.: Local Stimulation of Growth of Long Bones: Preliminary Report, Journal of Bone and Joint Surgery **34***A*:1-25 (*January*) 1952.

Contra-Angles

Two-Thirds of the Young With Gum Disease

Although the young men in our military services are deployed among 49 countries throughout the world, there are few reports concerning their dental health. We may assume that the caries rate is high and that upward of 90 per cent of these young people are afflicted with dental caries. The incidence of gingivitis among them has not been reported. If they follow the pattern of their military predecessors many of these military personnel are probably suffering from gingivitis and a considerable number from the malady with 24 synonyms —ulceromembranous gingivitis.

An enterprising Danish dentist, J. J. Pindborg, in a comprehensive study of gingivitis among military personnel has done a piece of work that for detail and thoroughness should shame many of our American college professors who turn out research reports. Pindborg examined 9,659 young Danes who were called for military duty. Among them he found 26.1 per cent with normal gingiva; 66 per cent with chronic gingivitis; and 6.9 per cent with ulceromembranous gingivitis.

Among other things, this observer noted that ulceromembranous gingivitis is more frequent during the autumn months. It is highest among outdoor workers and laborers; and lowest among clerks, business men and professional people. The outdoor country life does not appear to be conducive to gingival health, particularly if the outdoor worker is indifferent about the toothbrush.

Local factors of causation are more likely to concern dentists than are general factors for the good enough reason that dentists can do some-

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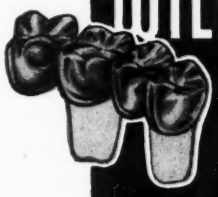

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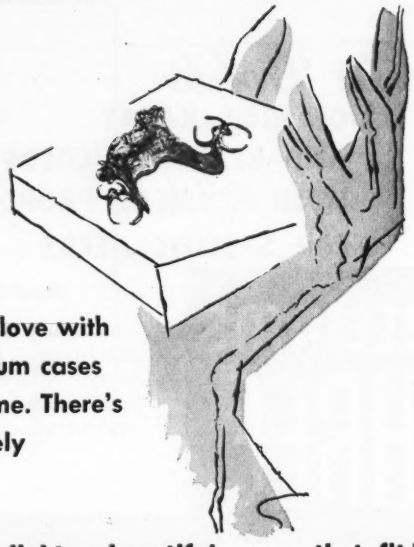

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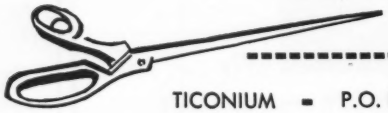

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thing to correct local conditions. Simple marginal gingivitis and the acute ulceromembranous kind are more frequent in the anterior mouth regions. Frequency of gingivitis is seen with increasing deposits of calculus and the more one smokes the more the calculus is formed. This association between calculus formation and smoking may not be too promptly accepted by American dentists.

In regard to etiology and control of ulceromembranous gingivitis Pindborg says:

"Whether the fuso-spirillary symbiosis or some virus be considered the cause of ulceromembranous gingivitis, a great importance must be attributed to the predisposing causes. It has been shown in the present investigation that ulceromembranous gingivitis in almost all cases occurs on the basis of a simple marginal gingivitis already present; the poorer the hygiene of the mouth the higher the frequency." Most of us will agree with that.

Every dental clinician learns early in his career that he has poor treatment results with cases of ulceromembranous gingivitis unless smoking is rigidly prohibited. Pindborg's exhaustive study concerns this well-known clinical impression. Tobacco is not good for the mucous membranes of the mouth and gums.

What are the factors in tobacco smoke that are harmful? Pindborg lists the following:

"(1) The tar which is present in the smoke exerts a directly irritating effect on the gums and thus gives rise to gingivitis.

"(2) The direct heat influence of the smoke on the gums is said to be capable of causing gingivitis.

"(3) Carbon monoxide, pyridine and other poisons present in the smoke are also said to be capable of exerting such a toxic effect on the gums that gingivitis may occur.

"(4) Nicotine causes vascular spasms, and it is possible that the nicotine contained in the smoke causes contraction of the capillaries in the gums and in this manner interferes with the nutrition of the gums, which consequently become less resistant to infection."

No member of the human family can be more exasperating than one who has undergone any kind of reformation or conversion. The former drinker who finds himself on the water wagon loses no chance to preach on the evils of drink. One who has smoked through the clandestine corn silk age up to the stogie age with almost every combustible product in between bears watching for his zealous words against smoking.

We are in the midst of hot debate concerning smoking as a chief cause of lung cancer. At the same time we hear the preposterous "medical" claims made in favor of smoking. Between the two extremes quite likely lies the truth. All smokers are not doomed to die an agonizing death from lung cancer and no one who smokes can possibly have his health benefited. On one side are the fear mongers, on the other the hucksters. In any case, I am convinced that the dental soft and supporting tissues in our young people are showing progressive inflammatory changes.

(*Continued on page* 466)

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BIBLIOGRAPHY: 1. "A New Approach to the Problem of Dental Caries Control": J Dent. Research (Aug.) 1953. Abstract available to members of the profession.

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 456 *and* 457)

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From:_____

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Subject:_____

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Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

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Smoking is one factor; malnutrition in the presence of adequate food supplies is another factor. I refer to the malnutrition that comes from robbing the body of essential foodstuffs by filling up with refined sugar in all its diabolic forms.

Robust youth should not have chronic gingivitis in the present rate of 66 per cent, nor should robust youth have chronic inflammation of other body parts and tissues in high per cent. Most of us are avowed defenders of the free enterprise system but some of us are beginning to wonder if forms of controls other than the safeguard of the Pure Food and Drug laws may not be needed to protect our people from their nutritional excesses of the wrong things and from their nutritional poverties for the right things.

The One-String Cello Player

I am indebted to James D. McCoy, the eminent orthodontist, for the story of the one-string cello player. In his response when he received the Ketchum award he said:

"Every so often we witness the introduction into our specialty of some method or procedure whose enthusiastic proponents either consciously or unconsciously look upon as being a panacea. They always remind me of the man who had a cello with a single string. He used to bow on it for hours at a time, always holding his finger at the same place. His wife endured this for some time but finally in desperation said, 'I have observed that when others play that instrument there are four strings and the players move their fingers about continuously.'

" 'Of course they have four strings and move their fingers about continuously,' he explained patiently, 'they are looking for the place, I have found it!'

"Now I do not mean to disparage the one-string cello players in our specialty for they have kept us on our toes and played havoc with the old reactionary spirit. We must therefore keep our minds open, our spirit of tolerance active, and keep all four strings on our own cellos attuned to common sense and hard work.

"I have often thought what a wonderful thing it would be if we could call back some of our pioneers, all of whom were strong in their convictions and in some instances not too friendly toward each other, and let them constitute a panel discussion at a meeting such as this. Doubtless some would have changed their minds, for certainly it is not just to say what a man would think now, just because he had strong ideas twenty-

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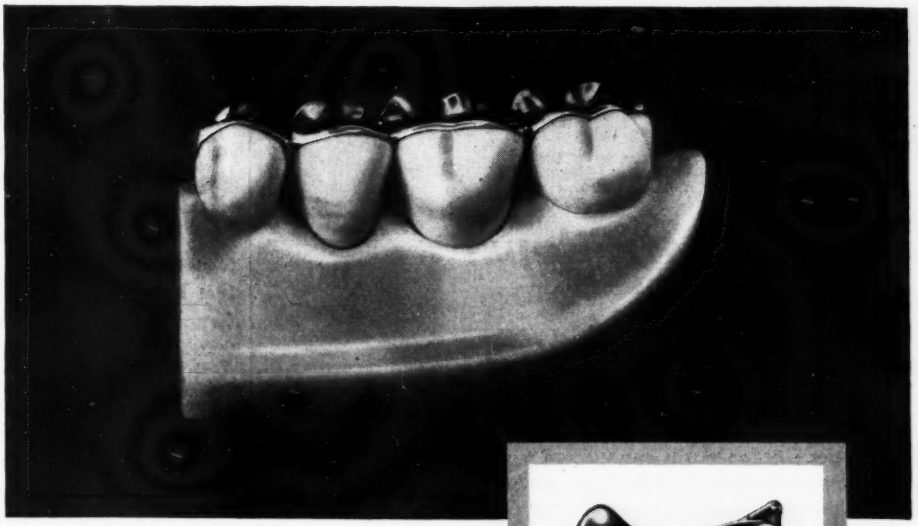

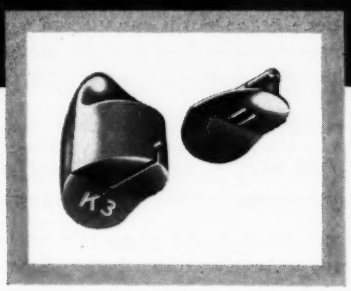

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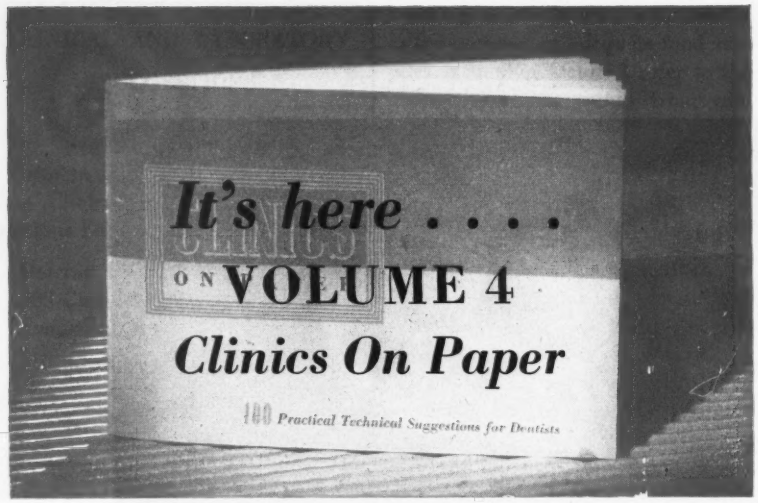

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five or thirty or fifty years ago! Most of us have changed our minds and even our concepts of the orthodontic problem and who knows but what future experience will cause us to alter positions we now hold. I for one have at various times been in danger of becoming a one-string cello player only to be rescued before it was too late by the wise counsel of co-workers in this Association.

"Perhaps I should conclude my remarks at this point but I fully realize that I may never again be placed before such a friendly audience and therefore I am asking your further indulgence to the extent of telling you a story. In 1665 a disastrous fire occurred in London and historic St. Paul's Cathedral was destroyed. Under the patronage of King Charles II, Sir Christopher Wren, the most famous architect of that period, was commissioned to rebuild it. One day as it progressed and he was inspecting construction details he came upon three workmen who were cutting stone. He was unknown to them so he asked each the same question. 'What are you doing?'

"The first, a surly man, replied, 'I am cutting stone!'

"The second man, who was almost equally as rude, replied, 'I am working for three shillings a day!'

"But the third man laid down his mallet and with the light of inspiration upon his face said, 'I am helping Sir Christopher build the Cathedral.' Now you and I, in the great scheme of things so far as our profession is concerned, are but humble cutters of stone but we can, by our efforts cause a cathedral to be built, if judged by its benefits to children, whose lofty spires will reach the blue skies of Heaven itself. I for one am proud to be a humble cutter of stone and do my part in building and maintaining this temple, not made with hands, which we call orthodontics."

Here there are actually two stories. One of the man who was a monotone in his way of life. He might be compared to the man who looked for single causes of disease and single methods of treatment—the one-string cello player. Disease is not that simple

and treatment cannot be grooved to a routine. There are too many variables. No two people are ever alike. No two disease processes are ever the same. Treatment cannot be standardized. We must all learn to play on four strings rather than on one.

The other story is of an attitude toward a job. Every vocation has its moments of boredom. Glamor in a vocation is a rarity. The movie star must undergo gruelling hours of rehearsal doing the same thing over and over again. The Senator, the Governor, the President, have their lives filled with answering silly letters and questions and shaking the hands, limp or bone-crushing, of thousands of curious people. The war correspondent sleeps in the cold rain or may be bitten by mosquitos or worse things. The distinguished judge spends weary hours in reading dreary law books and wordy lawyers' briefs. The surgeon, the engineer, the dentist have their days full of routine and have frequent unpleasant tasks. To lessen our boredom on any job we must believe that what we are doing is important. The feeling of important work is not the same as an attitude of pomposity or self-importance. Every worker, if he does his job well, should feel that he is making a contribution to human life, comfort, safety, or progress. Pick the vocation that seems lowest in the scale of social acceptance and we will find that if the work is done well it has value in the interdependent economic scheme. All *good* work is important work!

There are many present-day complaints that the spirit of pride in craftsmanship has flown from our ambitions. Unhappily, these complaints are justified. Most of us have had things too easy for the past ten years. Business has been good, jobs have been plentiful. Two examples of indifferent workmanship are current automobiles and new houses. Both have more frills and gadgets. Neither is as carefully and substantially made as were the cars and houses before workers were so independent. We may even presume that the same careless spirit of craftsmanship pre-

(*Continued on page* 472)

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She also said that he told her he didn't know what he did before he investigated P. F.

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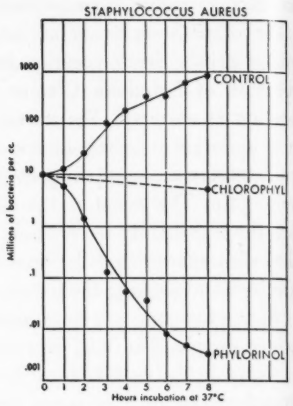

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